

COMPUTERWORLD

Mellon slaps ex-IS exec with lawsuit

Shah's competing shop stole away bank's VPs

BY NELL MARGOLIS
CW STAFF

PITTSBURGH — Mellon Bank Corp. roared into court last week and charged its recently departed top-ranking information systems executive with plundering Mellon's IS resources to set up his own competing shop.

Former Executive Vice President of Information Management and Research Bipin C. Shah abruptly left the bank in late July after a scant six months in office to start his own financial transaction processing services firm, taking along four highly placed Mellon IS executives.

Early on, the Shah affair is tinged with irony. On his first official day on the job at Mellon, Shah had voiced doubts about the continuing viability of the bank's role as an outsourcer.

Last week, the \$30 billion bank reiterated its dedication to outsourcing, announcing a long-

Continued on page 20

'New' IBM sets major product revamp

BY JOHANNA AMBROSIO
CW STAFF

ARMONK, N.Y. — A barrage of product and corporate announcements due next month will showcase a new IBM unleashing its business units to battle it out for IS hearts, minds and 1993 budgets.

Information systems executives said they are delighted at the prospect of heightened com-

petition within IBM.

"Turn them loose. If it results in more choices and better prices, I'm glad to see them take the gloves off," said David Moore, senior vice president at Mellon Bank Corp. in Pittsburgh. "It's the good old American way."

Among the announcements expected in September are the following:

• High- and low-end Application

System/400s, as well as a disk array for the midrange line (see story below).

• Lower priced Personal System/2s and the spin-off of the personal computer hardware business from the Personal Systems Division.

• New RISC System/6000 models and a transaction processing



monitor that will position the Unix-based family to take on its mainframe siblings.

• Enhancements to make IBM's Ad-

vanced Peer-to-Peer Networking protocol better able to track resources across the network.

In fact, the only major division absent from the fall festivities will be Enterprise Systems, which may announce some software later this year but will hold off on new mainframes until early next year [CW, Aug. 24].

Big Blue fights AS/400 mid-life crisis

BY KIM S. NASH
CW STAFF

NEW YORK — IBM's planned announcement tomorrow of a mid-life kicker to the Application System/400 E series — just six months after unveiling the line — is an attempt to imitate the continuous product boosters common in Unix and personal computer markets, observers said.

So make way for the Model E95, a four-way processor expected to surpass the performance of the current top-end E90 by 20%. Also expected, according to analysts briefed by IBM, is a storage subsystem based on Level 5 redundant arrays of inexpensive disk technology.

IBM has to make such splashy moves to sustain market interest and match the fast-clip sales pace that the AS/400 has racked up since its introduction five years ago, analysts and users agreed.

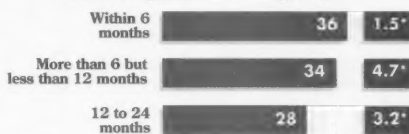
AS/400 sales volume is expected to top 64,000 units sold worldwide this year, up 9% over 1991's

Family values

More than half of the 194 AS/400 sites responding plan to stay in the family when they upgrade their machines

When do you expect to upgrade your AS/400 processor?

Number of respondents who stated upgrade plans



*Average number of AS/400 systems due for upgrade per respondent site

Source: CW Database Division

CW Chart: Michael Higgins

59,000 sold, according to International Data Corp. in Framingham, Mass. This is healthy growth, compared with the projected 2% decline in the number of Digital Equipment Corp. VAXs shipped this year.

Sharp, well-defined marketing efforts aimed at small to midsize businesses help IBM win new customers. "This is not just upgrade business from older System/36 or 38 sites," said Susan Gannon,

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Technology shifts, costs give buyers new 'lease' on PCs

BY MICHAEL FITZGERALD
CW STAFF

Pinched resources and rapid changes in ever cheaper personal computer technology appear to be leading many firms toward leasing desktop computers.

Analysts said corporations

are becoming more interested in PC leasing. Hughes Aircraft Co., for example, recently revealed that it has decided to buy inexpensive clones and lease high-end PCs and servers [CW, Aug. 17].

"The asset base [of installed PCs] is getting so large that it makes a difference in the company's books," said W. Thomas Shipley, program director at Gartner Group, Inc. in Stamford, Conn.

The outlay for PCs has become a high enough cost that buying new ones can present a periodic spike in a company's capital budget. Leasing essen-

tially smooths that spike. While actual PC leasing data is sketchy, Shipley and analyst Jack Karp at Meta Group, Inc. in Westport, Conn., both said they have recently seen a sharp uptick in inquiries about PC leasing from their corporate clientele.

The Computer Dealers and Lessors Association said its members leased some \$1.9 billion in PCs, workstations and terminals last year. That is down slightly from 1990 due to dramatic price erosion, though the number of units leased is believed to have increased.

"It's one of the fastest growing parts of our business," said Robert Bardagy, executive vice president of marketing at Comdisco, Inc. Bardagy said Comdisco may lease \$100 million in PCs this year, as opposed to

Continued on page 8

Virus vaxers

Users gave their PC antivirus software strong ratings in response to the question, "How satisfied are you with your software's overall ability to protect data?"

See Buyers' Scorecard, page 83

Product	Score
Microcom Virex	8.8
Central Point Anti-virus	8.4
Symantec Norton Anti-Virus	8.4

Maximum score: 10



INSIDE



Coping with a natural disaster: Some IS shops were prepared for Andrew; others were not. Page 6.

Downsizing converts sing client/server praises. Page 4.

Product Spotlight — The five questions to answer before frame-relay implementation. Page 87.

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NEWS

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- 14** **IBM** is expected to announce Network Control Program Version 6.2 with APPN support on Sept. 15.
- 15** **IBM's** Personal Systems Division plans to secede on Thursday.
- 16** **Intersolv** departs the AD/Cycle alliance, citing the high cost of the **IBM** 'halo.'
- 20** **Kodak** adds applications to its Photo CD for business users.
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Quotable

"Turn them loose. If it results in more choices and better prices, I'm glad to see them take the gloves off. It's the good old American way."

DAVID MOORE
MELLON BANK

On the increased competition among IBM business units. See stories page 1, 14 and 15.

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EXECUTIVE BRIEFING

■ A September product rollout is once again planned by **IBM**, but it won't be the traditional big-iron blitz. Instead, next month will show the new **IBM** as various divisions fight for IS hearts, minds and budgets. Among the expected products: new AS/400s and PCs, a transaction-processing monitor for the RS/6000 and networking gear. The expected PC hardware spin-off will get an official kickoff as well. **Pages 1, 14 and 15.**

■ **OS/2 Version 2.0** balks at certain mixed-vendor setups, according to PC consultant **Fabian Pascal**, who spent several months studying OS/2 on non-**IBM** hardware. Although he likes the software, he says to watch out for compatibility and support problems using Extended Industry Standard Architecture and quirky windowed DOS sessions. **Page 93.**

■ **IS** execs are getting serious about personal digital assistants, better known by names such as Sharp's Wizard and the HP 95LX. One research firm expects them to outsell PCs by the mid-1990s. **Page 8.**

■ **IS** executives at Downsizing Expo report savings of up to 50% from replacing their aging mainframes with LANs and servers. **Page 4.**

■ **IBM's** computer-aided software engineering initiative takes another hit as partner **Intersolv** pulls out of the AD/Cycle alliance, saying membership fees were just too much. **Page 16.**

■ Performance tuning has found a new starting point — the application. Users who once focused tuning efforts on their mainframe systems software are now trying to make their applications run more efficiently. **Page 77.**

■ Distributed computing is also a target for efficiencies. Tools are becoming available to help users optimize a distributed system by predicting resource demand. **Page 71.**

■ Low-end peer-to-peer networks are healthier today than people thought they would be, defying the death knell that powerful client/server systems were expected to sound for it. **Page 63.**

■ PC support personnel are more stressed out than the average worker, largely ambiguous because of job expectations and confusion over their roles. **Page 61.**

■ Code generators may help to make life easier for Windows programmers, rolling design, prototype and coding into a single, automated step. **Page 85.**

■ Can a technical degree get you to top IS positions faster than an MBA? Not necessarily. Two executives, one of whom traveled the technical route while the other took the business track, show how they arrived in top IS positions. **Page 100.**

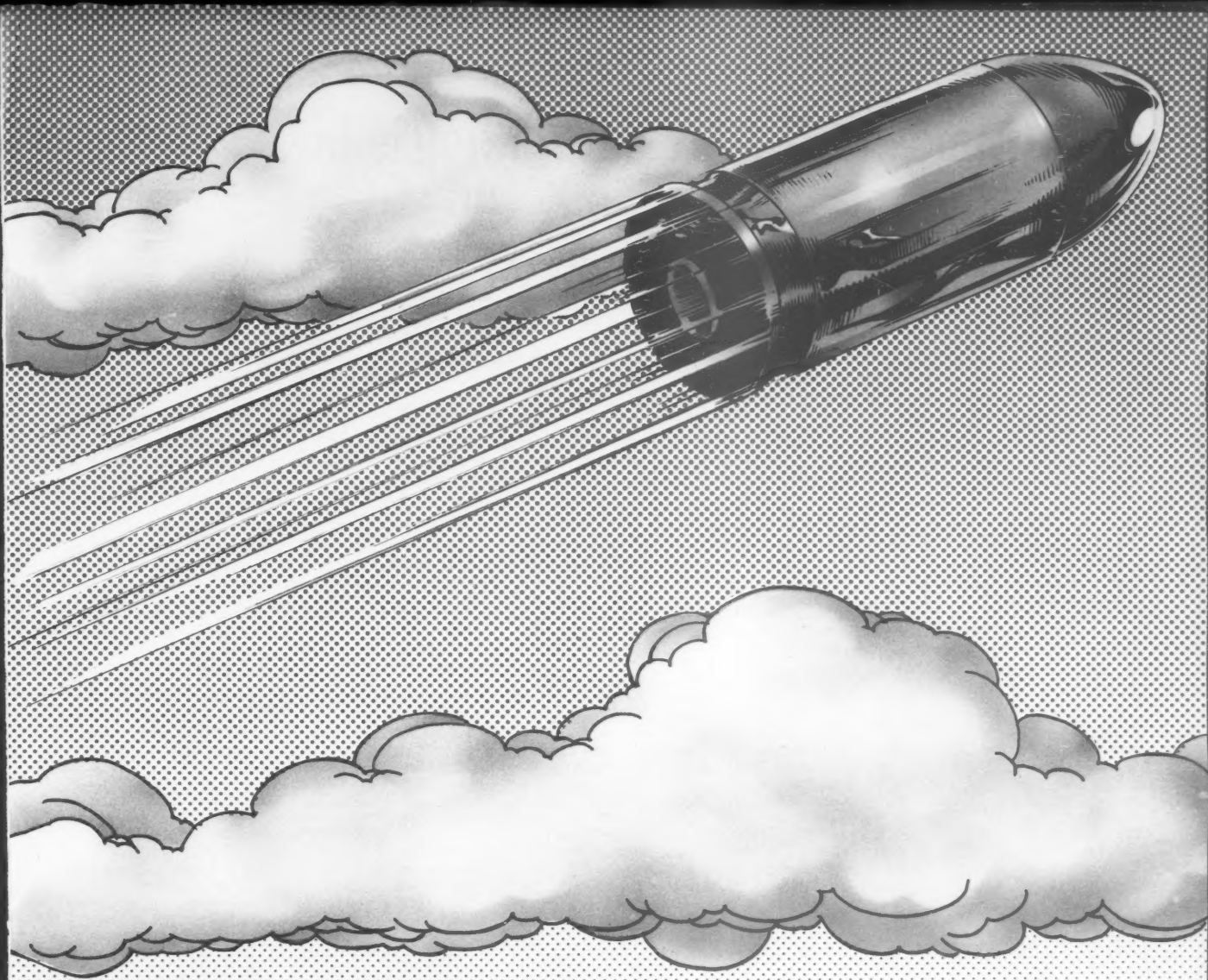
■ Users are increasingly looking to lease PCs as a way to cope with tighter budgets and the quickly changing desktop technology. **Page 1.**

■ **Compaq's** bid for the printer market begins this week when it unveils two network-ready units. Analysts say the company has a good shot at shaking up market leader **HP**. **Page 12.**

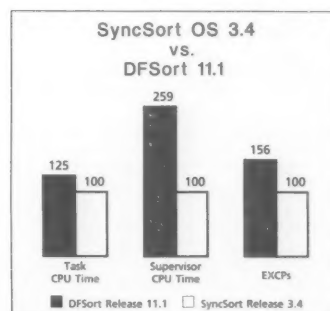
The 5th Wave



"I JUST MOVED INTO ONE OF THOSE SMART HOUSES THAT YOU CAN PHONE UP AND HAVE DO THINGS. WELL, THE OTHER DAY I GOT A WRONG NUMBER, AND BEFORE I COULD HANG UP, THE GUY TURNED THE LIGHTS OFF, FED THE DOG AND DRAINED THE JACUZZI."



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FASTER THAN A SPEEDING
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Mainframe-to-PC LAN shift taking hold

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — Downsizing was once the byword of missionary personal computer advocates who preached to the unconverted, railing against the high cost of centralized computing on mainframes. But at this year's Downsizing Expo, true information systems believers attested to the 30% to 50% cost savings achieved by moving mainframe applications to local-area networks, spurring pledges from the newly converted to follow in their footsteps by 1995.

Salt Lake County, Utah, is one such organization. The county plans to replace an IBM 3090 Model 170 by 1995 with a mix of IBM Application System/400 machines and Unix servers. Ken Schwartz, director of MIS, said the driving reason for his decision was simple: "Costs, costs, costs." He has a \$5.5 million budget, 40% of which is dedicated to hardware.

More common than an IBM 3090 replacement, however, is the replacement of midsize, underpowered mainframes such as IBM 4300s. "Those machines have to go anyway, so why not move to state-of-the-art architecture?" asked George Schussel, president of Digital Consulting, Inc. in Andover, Mass., which sponsored the conference. "In two to three years, I think you'll commonly see PCs and networks of servers directly replacing mainframes."

Making the change to downsized systems — and re-engineering the enterprise at the same time — can be a dizzying experience, reported some who have done it.

"If you do it wrong, it could be the end of your business," noted Morti Tenenhaus, executive vice president of CompuCom Systems, Inc., a Dallas computer retailing firm. "Nobody likes to experience a [gravity] force of 1 or 2 or 3 Gs on an airplane, but we do it if we are told to do it by the CEO, and we learn to live with it."

He said CompuCom was forced to re-engineer its business and to use LAN technology to compete more effectively with other retail chains — some of which have since gone out of business.

Some users have taken a more gradual approach to downsizing. Starting in 1988, United Parcel Service, Inc. installed 100 PC LANs that took over the handling of selected mainframe applications. Today, Atlanta-based UPS has 1,000 such LANs in place running 50 key applications — and a total of 35,000 PCs in the enterprise.



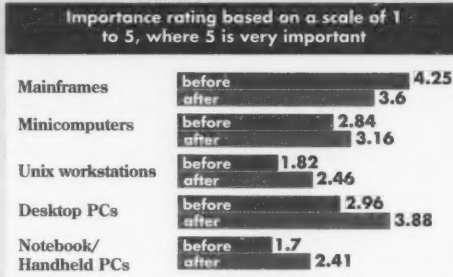
Covia's Teflian:
Foresees hybrid nets

Despite the build-up in small systems, the payback for investing in downsizing came quickly at UPS, said Marc Dodge, a telecommunications manager at UPS in Mahwah, N.J. Savings will vary from project to project, but a 40% rate of return is possible in some cases, Dodge said. One \$8 million downsizing project paid for itself in just six months through reduced labor and hardware costs and increased productivity.

However, UPS' mainframes remain intact in the company's Mahwah computer center, processing hundreds of thousands of on-line transactions per day — or large applications that require 5G to 10G bytes of data. "The mainframe is still a great place to store data," Dodge said. "We do

One extreme to the other

After an enterprise is re-engineered, mainframes still have a role to play, according to 100 IS managers



Source: Business Research Group

CW Chart: Janell Genovese

a lot of local processing [on the LANs] and then send data up to the mainframe, where it is stored permanently." Central storage protects data integrity, he said.

PCs: Not total solution

Strict replacement of mainframes with Intel Corp.-based PCs is no longer seen as a comprehensive or even desirable solution. One reason is that even the most powerful Intel 486 PCs lack the memory capacity or channel bandwidth to support many data center on-line transaction processing applications.

Accordingly, some large sites plan to replace some of their mainframes with Unix parallel processors running relational databases in the mid-1990s. But because parallel processors are in their infancy as commercial machines, these sites are beginning to downsize by moving selected applications to LANs (see story at right).

Many large mainframe sites will choose to create hybrid networks of IBM-, Unix- and PC-compatible applications, said Mark Teflian, president of Covia Technologies, a subsidiary of

United Airlines that sells IS shops the heterogeneous networking software it developed for Covia's own reservation systems.

"Meaningful downsizing will take place through distributed processing, not through putting a mainframe application on a smaller machine," Teflian said.

One such hybrid network project, although not connected with Covia's services, is taking place at GTE Telephone in Irving, Texas. That company plans to combine its IBM mainframes with Hewlett-Packard Co. Unix servers at 52 customer service centers nationwide [CW, March 16] (see story page 97).

Many users here did not hide the fact they have not yet embarked on full-fledged downsizing. But many of them said they are conducting pilot projects to prove that the concept works well in real life.

"We're a little on the late side," said Rob Sacco, manager of IS at GTE Products Corp.'s Sylvania Lighting Division in Danvers, Mass. "But after talking to 40 people here, I know there are a lot of people who are on the late side."

3Com ups Ethernet ante with parallel-tasking adapter card

BY MICHELE DOSTERT
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. has begun shipping a new 16-bit Ethernet card that the company claims will outperform other 16-bit cards by as much as 55% — and also outperform 32-bit cards by up to 20%.

In addition to positive results from independent test laboratories, users and analysts are uniformly enthusiastic about the new card's price and performance. Claude King, a senior systems analyst at the Universi-

ty of Florida in Gainesville, said, "We have them running in 486/33 EISA-bus production servers, and we've seen 20% to 30% better performance."

He explained that in servers, the Network Interface Card is often the bottleneck; the new card has fixed that. "Not only is it a lot faster than its competitors, [but] at \$187 per card, it's also cheaper."

The EtherLink III cards are based on a single-chip application-specific integrated circuit developed by 3Com. The card's speed is derived from a new

technology called parallel tasking, which 3Com developed and is in the process of patenting. Parallel tasking means the card can process packets in parallel — in effect, it begins processing the packet as it is coming off the wire rather than waiting for the entire packet to be received in adapter memory, as current Ethernet adapter cards do.

Todd Dagres, an analyst who follows network interface cards for The Yankee Group, said he thinks 3Com is going to sell "a ton" of the cards: "I predict that it will increase their Ethernet market share from 26% in 1992 to over 33% in 1993."

"People who need more speed are not going to Fiber Distributed Data Interface to the desktop; they're just buying fast-

er Ethernet cards. It's a growing market, and now 3Com has the hot product in it," Dagres added.

King listed several additional pluses. "The card doesn't use shared memory, which is good because we need every speck of our upper memory blocks to run Windows and networking; it can be configured and optimized for either 16-bit ISA or 32-bit EISA machines; and it's really easy to configure, either from the command line or via menus."

The 16-bit XT/AT bus EtherLink III card is currently available for both twisted-pair and coaxial media; 3Com intends to ship 32-bit Extended Industry Standard Architecture EtherLink IIIs in the fourth quarter of 1992 and a Micro Channel version of the adapters in 1993.

Think small

Downsizing Expo product announcements included the following highlights:

• **Sequent Computer Systems, Inc.** in Beaverton, Ore., showed one of its Symmetry 2000 Model 750 machines running Microsoft Corp.'s Windows New Technology operating system.

The system as demonstrated was connected through Novell, Inc.'s NetWare to several intelligent "client" personal computers running Windows 3.1. The large Sequent machine painted a fractal image on an oversize color monitor, breaking up the work among its 16 Intel 486 50-MHz processors. The image was stored in an Oracle Corp. Oracle 7 relational database management system.

• **AT&T's Application Development Solutions Division** in Orlando, Fla., announced a development platform that combines computer-aided software engineering tools and Cobol generators for downsizing mainframe Cobol applications. The Integrated Development Platform runs on a Unix server, but the Cobol code it generates can run on PCs or mainframes. The package will average \$2,200 per developer's workstation, AT&T said.

• **MAI Systems Corp.** in Tustin, Calif., announced MAI Financial Solutions, a client/server accounting package that runs against Sybase, Inc.'s RDBMS. It runs on a variety of Unix machines.

Users can access data from PC front-end packages, including Microsoft's Excel and Lotus Development Corp.'s 1-2-3. Modules are priced from \$40,000 per module, varying by CPU type and number of users.

• **Integrus**, a year-old systems integration division of Bull HN Information Systems, Inc. in Billerica, Mass., said its UniKix CICS-compatible tool kit for DB2 now supports Oracle and Informix Software, Inc. RDBMSs. UniKix prices start at \$8,000, but a typical developer's system is priced at about \$50,000.

JEAN S. BOZMAN

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NEWS SHORTS

IBM price hike targets hosts

IBM said last week that it is increasing hardware prices by 3% and software prices by 5%, effective immediately. The price hikes mostly affect the mainframe product lines because the RISC System/6000, Personal System/2, Application System/400 and disk storage devices are excluded. Customers who take delivery on merchandise before the end of the year will not have to pay the increased prices.

Mentor lays out layoff plans

Mentor Graphics Corp. said it will lay off up to 300 employees by the end of 1993 — and freeze the salaries of the remaining 2,000-member work force until then — as part of a financial recovery plan outlined last week. Upcoming fiscal third-quarter 1992 results will take a \$15 million to \$25 million hit as a result of the restructuring. A "significant" portion of Mentor's top staff will be redeployed.

Aldus pursues alleged virus source

Former Canadian computer magazine publisher Richard Brandow has been accused of planting a computer virus that tainted thousands of copies of Aldus Corp. software in 1988. Brandow, 28, allegedly arranged for a peace message to flash briefly on Apple Computer, Inc. Macintosh screens. The virus eventually infected a master disk for Aldus' Freehand illustration program, reportedly costing the firm \$7,000 when it had to recall 5,000 copies. Brandow said the purpose of the act was to educate the public to the danger of viruses. He has been charged with malicious mischief and could face up to 10 years in prison if convicted.

Librex to exit notebook market

Librex Computer Systems, Inc. late last week became the second victim of the raging personal computer price wars. The notebook maker has not made money since it was formed in June 1990, said Librex Vice President Daniel Crane, who blamed Taiwanese overcapacity for shrinking margins. Librex executives have until the end of March 1993 to sell the firm or license its technology. Pen-based vendor Momena Technologies, Inc. recently closed its doors.

AT&T cuts high-end network prices

AT&T last week dropped prices on two of its high-speed network offerings, including a 25% rate reduction on its Software Defined Data Network and Switched 384 Service and a discount plan for users of its Integrated Services Digital Network (ISDN) product who spend \$4,800 annually on switched data over the ISDN D-channel.

DEC teams up with Storage Tek

Digital Equipment Corp. and Storage Technology Corp. last week set up Rocky Mountain Magnetics, Inc., a joint venture to produce and sell inductive and magneto-resistive thin-film heads for disk drives. DEC, which holds a controlling 81%, expects to put \$50 million into the firm.

Short takes

Microsoft Corp. has made public a tape format specification for the Windows New Technology operating system. The specification is part of the Windows Open Services Architecture and comes from a development effort with Maynard Electronics. . . . This week, IBM and San Francisco-based Grubb & Ellis Co. are expected to launch Axiom Real Estate Management, Inc., a joint venture that will kick off with some 80 million square feet of office, industrial and retail space. . . . DEC last week filed a shelf registration statement covering up to \$1 billion in aggregate principal of its debt securities. The proceeds are slated for capital expenditures, restructuring and additions to working capital. . . . Richard Bradock, Citicorp's chief operating officer and president joined Lotus Development Corp.'s board.

More news shorts on page 16

IS blunts hurricane's impact

Prepared for worst, some data centers were hurt; others weathered fine

BY GARY H. ANTHERS
CW STAFF

Thanks in part to timely and accurate weather forecasts, many data center managers in the lower Southern states were prepared last week for the onslaught of Hurricane Andrew, the costliest natural disaster ever to strike the U.S.

Even so, by the weekend, many companies in the hardest hit areas in Southern Florida and Western Louisiana could not be reached, and it was feared that some may have problems far worse than a temporary loss of computer cycles.

"Most of the customers we were able to reach had backed up their data and were in pretty good shape," said Carl McKinley, director of customer service at Maynard Electronics, a Lake Mary, Fla., division of Archive Corp. that makes data backup systems. "But south Dade County, Homestead, those areas — you can forget it. The last thing they are thinking about is their computer systems."

"This is the largest single disaster to affect computer facilities," said Tari Schreider, chief executive officer at Contingency Planning Research, Inc., a disaster recovery consulting firm based in Jericho, N.Y.

According to Schreider, by late last week 39 major companies had moved to backup processing sites provided by computer disaster recovery firms. Another 50 had put their vendors on alert. He said the numbers are likely to climb higher this week as employees return to businesses incapacitated by wind, water and lack of power.

The Miami data center of Philadelphia-based Comcast Corp. lies just north of an east-west line that separates those facilities that merely lost power from those that were blown away, said Douglas Murphy, director of MIS at the company.

Data centers more than 15 miles south of central Miami "may or may not still exist," Murphy said. "It looks like a bomb went off down there."

UPS reliance

The Comcast data center, which houses an IBM 4381 mainframe and other computer gear, was protected by security shutters, but other parts of the building suffered wind and water damage, Murphy said. When power failed, Comcast kicked in its uninterruptible power supply (UPS) and diesel generators.

Murphy said estimates of when power might be restored ranged from days to weeks. "In theory, the UPS can run indefinitely, but remember, it's a mechanical structure, and you have to keep it fueled and oiled. It's gone up and down, but we think we have it stabilized now."

The main data center of Miami-based Ryder System, Inc. is also equipped with a UPS, but Ryder elected to shift operations to a backup site in New Jersey, according to a computer operator at the mostly deserted Florida headquarters. "The backup facility is supporting all our users throughout the country and in the UK," he said.

A number of companies made arrangements that ultimately proved unnecessary when Andrew's worst passed them by. For example, one Miami-area

company sent people and computer backup tapes to the Warminster, Pa., facility of Sungard Recovery Systems, Inc. but never initiated processing there.

Other firms did not arrange for a backup processing site and considered themselves lucky they did not need one.

Lucky in Louisiana

Saia Motor Freight Line, Inc. in Houma, La., kept its Unisys Corp. 2200 mainframe alive with a UPS after Andrew knocked out power to much of coastal Louisiana. "We've discussed having a hot-site arrangement several times but haven't done anything yet," said Robert Watson, senior systems analyst at Saia.

Asked what Saia would have done had it been hit hard enough to incapacitate the UPS, Watson said, "We'd have been in deep doo-doo. I don't know what we would have done." However, he noted that the firm did have tapes of key software and files stored off-site.

According to Schreider, Southern Louisiana is populated by light manufacturers with sales of between \$10 million and \$20 million running systems such as IBM System/36s, System/38s and Application System/400s. "Typically, these are not companies that go out and spend \$500 to \$700 a month for backup agreements," he said.

Some may be so small they do not need to. Jon Paul Olivier, director of computer operations at Gulf South Engineers, Inc. in Houma, said he wrapped his Digital Equipment Corp. MicroVAX II and his personal computers in plastic and moved them to higher ground before the storm.

Andrew afflictions

NEW ORLEANS — At the Regional Transit Authority (RTA), which operates the city's buses and fabled streetcars, a drive failure shut down an IBM AS/400 system before stormy weather had a chance to wreak havoc.

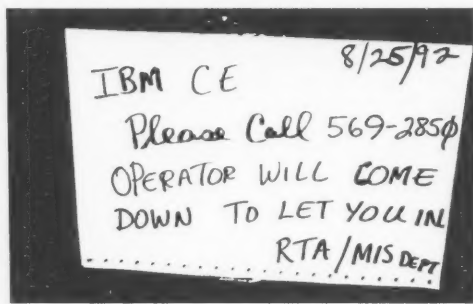
That failure last Monday created other hurricane-related problems, as the oncoming storm caused IBM to close business the next day and prevented it from sending its service rep to the customer site, noted John Sullivan, an independent consultant at the RTA's IS shop.

Had the representative arrived Tuesday, that individual would have encountered locked doors at the deserted Maison Blanche department store, where the RTA's IS operations are located.

Both IBM and the RTA remained closed on

Wednesday, and it was not until midday Thursday that the RTA expected to see its service person. In the meantime, it was making do without its maintenance and materials program.

MARK HALPER



A hand-scrawled sign taped to a side RTA entrance lined with sandbags tells the IBMer who did not show how to get in

Mark Halper

**WHAT HAVE
BILL GATES,
SCOTT MCNEALY,
JOHN SCULLEY,
JOHN YOUNG
AND LARRY ELLISON
AGREED TO
COOPERATE ON?**

Palm PCs make mini splash

Analysts predict personal digital assistants will soon overtake PC wave

BY MICHAEL FITZGERALD
CW STAFF

A wave of computing power that may prove as alien to personal computer managers as PCs once were to the glass house may be about to hit the realm of information systems.

The vanguard of these new computers, called personal digital assistants (PDA), is already here in the form of Sharp Corp.'s Wizard, Fujitsu Personal Systems Ltd.'s Poqet, Atari Systems, Inc.'s Portfolio and Hewlett-Packard Co.'s 95LX.

A survey by Technologic Partners shows that industry executives see these types of systems reaching 70 million units by the mid-1990s, outselling traditional PCs.

Some companies have made big buys already. For instance, Prudential Insurance Co. bought 10,000 Wizards for its agents, and Korea's Samsung Life Insurance Co. recently purchased 13,000 95LXs from HP.

"The whole appeal of these is [the idea of] ... computerizing hitherto uncomputerized people. The potential payoff is huge," said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass. "The question of where they fit in an organization is what's being hotly researched by a lot of companies right now."

A swarm of new systems that are easy to hold in one hand is slated to arrive by year's end, and analysts said their low prices could bring them into corporations on an ad hoc basis (see story page 37).

Examples of new machines range from Apple Computer, Inc.'s Newton, which is expected in early 1993, to sub-3-pound, DOS-compatible devices from Gateway 2000 Ltd. and Zeos International, Inc.

James Cannavino, general manager of IBM's Personal Systems Division, said at a briefing in late May that the firm would also have a PDA. IBM said last week it will show several PDA prototypes at Comdex/Fall '92.

"I think they'll affect [IS] about as much as a cellular phone affects it," said Richard Shaffer, publisher of "ComputerLetter," a newsletter put out by Technologic Partners. "They'll be really handy but not a major factor."

IS "is going to have to be prepared for these things," countered Andrew M. Seybold, editor in chief of "The Outlook on Professional Computing" in Brookdale, Calif.

Seybold said these devices could cause problems for networked environments in particular, as networks struggle to handle the "disappearing node" effect created by portables.

Hung jury

Users remain split on the value of PDAs and the impact they will have on IS. Those who have them installed see them as positive.

"I view it as an opportunity to get more information in people's hands," said Bob Martin, manager of executive support systems at Eaton Corp. in Cleveland. Martin uses HP's 95LX to run his schedule. "It's not our job to control things — our users need

the ability to run the business."

"Personally, I think these are the future of computing," said Bill Bozym, IS planning and technology assessment specialist at Pacific Bell Directory in San Francisco. The directory unit has outfitted 300 salesmen with Fujitsu's Poqet system.

But other users expressed skepticism about handhelds.

"Mostly I see it as gadgetry," Rick Marolt, IS manager at Great Central Insurance Co. in Peoria, Ill., said, summing up several users' opinions.

Marolt hedged his criticism, though. "Something tells me it's going to make a big difference — something I haven't put my finger on yet."

Still, even users who regularly put their fingers on palmtop-type devices debate their worth.

"There is a movement [internally] that says [the Poqet] may not be a good long-term decision," Bozym said. "If you talk to the accounting/finance people, they think it's crazy to buy these, based on where we want to be in five years. Then again, [the Poquets] are being used."

Most analysts see these devices challenging IS departments as PCs once did, and some users agree.

"These definitely could in the future become a threat to MIS," said Edward Wysock, senior applications coordinator at Merck & Co.'s Human Health Division in West Point, Pa., which uses Wizards. "Clearly they have potential for replacing the laptop. Our MIS department relies on us to build applications" for special projects involving the Wizard.

"It goes down as an expense rather than a capital item, and with prices continually going down and capabilities going up, we'd rather lease than have them on the books," said Carrie M. Ulvestad, national manager of dealer and vehicle systems at Hyundai Motor America in Fountain Valley, Calif.

Hyundai leases servers and notebook and desktop computers.

Great outlet

Bill Wiley, operations coordinator at A & C Intercom Services, Inc., a Phoenix-based utility consulting firm, said his company turned to leasing two years ago because "we had a growth rate of 133% one year, and we had some issues of cash flow, so leasing was a great outlet for that growth."

Meanwhile, Hughes is negotiating a deal to lease systems that cost more than \$1,500 apiece, the highest expense it can claim under U.S. Department of De-

Shooting for the stars

Toshiba's Satellite laptop targets low-cost market

	T1800	T1850	T1850C
Price	\$1,799	\$2,199	\$3,299
Processor/ CPU speed	386SX 20 MHz	386SX 25 MHz	386SX 25 MHz
Hard disk	60M bytes	80M/120M bytes	80M/120M bytes
RAM	2M to 10M bytes	4M to 12M bytes	4M to 12M bytes
Display type	9 1/2-in. VGA monochrome	9 1/2-in. VGA monochrome	9 1/2-in. VGA Ultra STN-LCD color
Weight	6.8 pounds	6.8 pounds	7.3 pounds
Battery life	3+ hours	3+ hours	2+ hours

CW Chart: Michael Siggins

Toshiba hopes Satellite launches sales sky-high

BY MICHAEL FITZGERALD
CW STAFF

IRVINE, Calif. — Toshiba America Information Systems, Inc. hopes the low-priced Satellite line it will launch today kicks its sales out of stationary orbit.

The new line marks Toshiba's effort to parry Compaq Computer Corp.'s Contura line of low-cost notebooks and may signal that Toshiba is once again becoming aggressive in the notebook market in an effort to win back lost market share.

"I think they'll get a good reaction" from the market, said Tim Bajarin, an analyst at Creative Strategies Research International, Inc. in Santa Clara, Calif.

The Satellite line will retail starting at \$1,799 for a 20-MHz Intel Corp. 80386SX-based notebook with a 60M-byte drive. The line will feature a passive-matrix color notebook with a screen that clearly surpasses that of rivals AST Research, Inc., Dell Computer Corp. and Leading Edge Products, Inc., Bajarin said. With a list price of \$3,299, street pricing for the notebook may fall to \$2,500.

Targeted to the cost-conscious buyer more than to Toshiba's traditional corporate purchaser, it will sell through mass merchant channels.

Steve Lair, Toshiba's vice president of marketing, said the firm expects the Satellite line to cut into sales of the T2200, its best-seller on the low end.

Bajarin said he thinks the products will do well but may not surpass Toshiba's higher priced lines in sales.

"The value-type shopper is shopping in different places than the corporate buyer, and this gives Toshiba a way to play there. But there's still a tremendous amount of buying done on price/performance," he said.

The Satellite line features the same keyboard as the T4400, giving excellent play, and adds several nice touches, such as sliding doors for the ports and the modem jack.

Toshiba, long bashed by analysts for responding too slowly to trends in the portable market and being overpriced, appears to be changing.

For instance, \$30 billion Toshiba Corp. cut prices on its portables only three days after Compaq introduced its Contura line in June, thanks to prodding by Atsutoshi Nishida, Toshiba America's president.

fense regulations. Ben Berry, manager of computer services at Hughes, said the company wants to lease high-end PCs and servers because "capital is so tight."

Shipley said book value ratios of PCs are now exceeding those of mainframe and minicomputers at many large companies, and this has brought the cost of PCs to the attention of company controllers. He also cited the hidden cost of managing PCs when you own them.

"It costs a company between \$250 and \$500 just to touch a PC because of paperwork, etc.," Shipley said. He said some leasing companies, such as Comdisco and Chrysler Systems Leasing, offer completely electronic leasing, which saves costs. Leases tend to be flexible, giving users options in areas such as service, maintenance and upgrades.

Besides financial nuances, most users contacted cited the ability to avoid having obsolete equipment as a major plus to leasing.

At the same time, users in their first lease do have concerns about what happens when the lease ends.

"Until we've gone through it, I don't know how much lead time is involved, what it takes to convert people's information onto new machines, locate the new machines or what happens when hardware changes in and out of machines," Ulvestad said.

Technology shifts, costs give buyers new 'lease' on PCs

CONTINUED FROM PAGE 1

nothing three years ago.

User sites like Hughes and Eaton Corp., a Cleveland-based manufacturer, seem to confirm a trend. Eaton leases perhaps 5% of its PCs, usually for special projects of set length, but it is looking seriously at leasing more PCs, said Fred Zickert, microcomputer support manager.

"I'm not saying leasing has become a general way of going, but it's certainly being considered where it had not been in the past," Zickert said. "The state of the art [in PCs] is changing faster than the depreciation amount on the equipment."

Zickert added that increasingly modular PC designs make upgrading more realistic, as users can easily choose to add memory or other components

during the life of a lease.

"Our corporate strategy is to lease, not to buy. With today's technology, unless you're going to throw it away, fiscally speaking, on your books, to purchase something in hardware or software is really unsound," said Patrick Thomas, MIS director at Hickory White Co. in High Point, N.C.

Thomas said a multiyear lease saves him the headache of fighting for new appropriations for information systems when new technology becomes available and from figuring out what to do with outdated equipment.

It was the ability to treat leased PCs as an expense that drove a number of lease decisions, according to users contacted.

A COOPERATIVE-SERVER DATABASE FROM ORACLE

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*Bill Gates
Chairman and CEO
Microsoft Corporation*

"ORACLE7's breakthrough in hiding technological complexity is analogous to the ease-of-use breakthroughs accomplished by the introduction of the Mac in 1984."

*John Sculley
Chairman and CEO
Apple Computer, Inc.*



"The fundamental problem with early client-server database management systems is that applications cannot access data on more than one server without a lot of extra programming. This programmatic approach to accessing data on multiple servers is in stark contrast to the totally automatic approach provided by ORACLE7."

*Larry Ellison
President and CEO
Oracle Corporation*



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*John Young
President and CEO
Hewlett-Packard Company*



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*Scott G. McNealy
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Sun Microsystems, Inc.*

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LAN-to-host gateway debuts

Novell and Memorex Telex link NetWare, IBM mainframes

BY THOMAS HOFFMAN
CW STAFF

NEW YORK — Looking to leverage its large IBM 3270 customer base, Memorex Telex NV last week introduced a gateway that connects networked personal computers to IBM hosts via direct-channel attachment using Novell, Inc.'s NetWare for SAA local-area network-to-mainframe software.

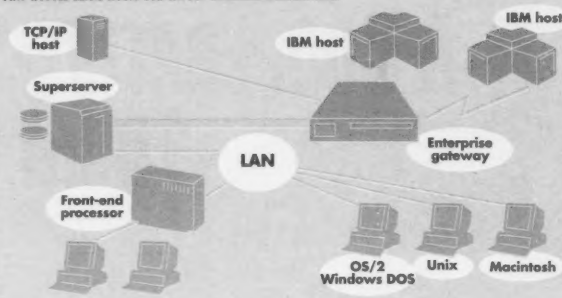
Memorex Telex, which after IBM has the second-largest installed base of 3270 peripherals products, will resell custom-

ized versions of Novell's NetWare for SAA software to its installed base. In addition, Memorex Telex will provide training, systems integration and support services to NetWare and IBM host users.

Developed by Memorex Telex and Novell, the 9430 Enterprise Gateway supports IPX/SPX, Apple Computer, Inc.'s AppleTalk and Transmission Control Protocol/Internet Protocol (TCP/IP). The gateway will be made available in the fourth quarter. Pricing will range between \$28,500 and \$55,600, depending on system configuration. Memorex Telex

An island no more

With Memorex Telex's Enterprise gateway, networked PCs, workstations and servers can access IBM hosts via direct channel attachment



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will market the product.

Jim Lindner, president of North American operations at Memorex Telex, said the two firms will develop other LAN-to-host connectivity products for large and midrange systems as well as storage devices shortly after the first product's rollout. Lindner said the firms plan to develop similar products for the airline industry.

The announcement was welcomed by IBM Systems Network Architecture (SNA) network users because the Enterprise Gateway eliminates the need for the front-end processors usually required for such connectivity. Channel connections provide improved throughput and response time with lower connectivity costs compared with front-end processors.

"We see this as a way of being channel-attached, while eventually eliminating the need for a front-end processor for communications" between LANs and hosts, said Alan Newton, director of MIS at A. Duda & Sons, Inc. in Oviedo, Fla., which has been testing the gateway for a month.

Newton said his company will consider other options before deciding to purchase the gateway. So far, he said, the Memorex Telex product has proven to be a viable alternative to installing a front-end processor for the wide-area network that A. Duda & Sons is planning. The company is using an NCR Corp. COM10 5645 front-end processor attached to an IBM 3081 mainframe over an SNA network to support 150 users in three states.

David E. Pinkus, manager of MIS at The Fuller Co., a Bethlehem, Pa., manufacturer, also has a keen interest in the gateway. Pinkus said Fuller is attempting to move 140,000 of its mainframe-based engineering drawings onto PC LANs, so he sees a strong demand for improving his company's LAN-to-host connectivity. "Plus, we do not see the mainframe going away, and we are constantly looking for ways to link [different environments] together," Pinkus added.

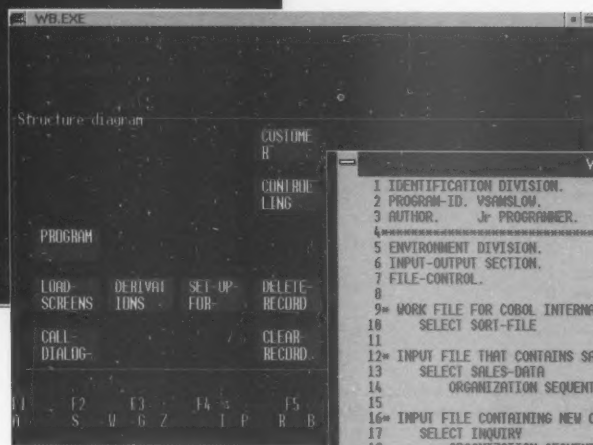
Fuller is using Rabbit Software Corp. gateways to link its NetWare v3.11 network operating system to its IBM 4381 host via an Ethernet microwave bridge and T1 connections. Pinkus said that although this configuration has led to file transfer failures, he thinks the new gateway with direct-channel attachment may help solve this dilemma. "We're a big TCP/IP shop, and we think these products can eventually help solve some of our connectivity problems."

Analysts were also enthusiastic about the new product. "The agreement brings the LAN and host together in a good, workable solution," said Dick Boyle, program director of local-area communications at Gartner Group, Inc.

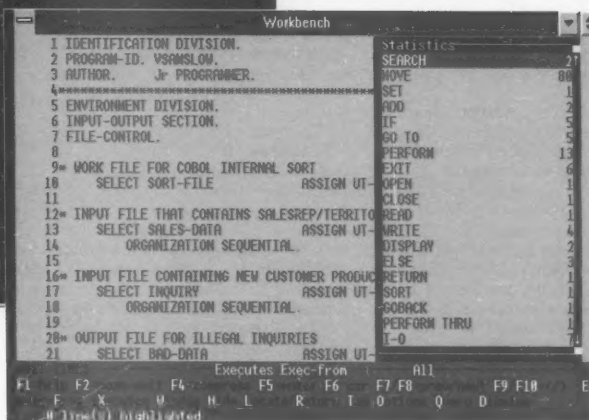
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HP users like MPE, but still explore Unix

BY MARK HALPER
CW STAFF

NEW ORLEANS — Information systems managers who run Hewlett-Packard Co. shops have intensified their interest in Unix, yet many plan to remain on HP's proprietary MPE operating system with its Unix hooks rather than migrate to full-blown HP/UX.

At the same time, shop managers from small to medium-size companies have serious misgivings about HP support, an issue the company said it will address with sales force changes this fall (see story below).

These are two of several findings from a survey presented by HP user group Interex at the group's annual conference last week (see chart).

In other results, open systems and industry standards jumped from fifth to third place in IS managers' rankings of strategic concerns, while Unix stan-

dards surged 11 places, from 19th place last year to eighth this year, according to the survey.

Good enough for some

But rather than go through the pains of migrating from HP's MPE operating system to its HP/UX version of Unix, a majority of the respondents expressed a preference to stay on the MPE system.

The most recent version of MPE, dubbed MPE IX, includes Posix hooks that some users said provide them with as much Unix functionality as they require.

According to Jane Copeland, who heads Interex's advocacy committee, 56% of the respondents said they will not migrate from MPE to HP/UX in 1992; 24% said they will. Most of the migration activity entails moving from older versions of MPE to versions with Unix hooks, such as MPE IX or the older MPE XL, Copeland said.

Shifting concerns

While database technology remains the key strategic concern for HP users, Unix standards are getting more attention

Top 10 strategic concerns		
	1992	1991
Database technology	1	1
Interoperability & network integration	2	6
Open systems & industry standards	3	5
Professional development	4	4
Application development	5	3
Performance & capacity	6	2
LAN operations	7	8
Unix standards	8	19
Data management	9	9
Distributed data	10	10

Source: The International Association of Hewlett-Packard Users

CW Chart: Michael Siggins

Several users at the conference explained that for mission-critical situations, they have more confidence in tried-and-true MPE than in the relatively unproven HP/UX. They said they also worry that HP/UX is not as secure an operating system as MPE.

But not all users are satisfied that "Unixized" versions of MPE are capable of handling certain Unix applications.

Chuck Cremer, HP systems manager at Ungermann-Bass, Inc. in Santa Clara, Calif., said his firm is concerned about a lack of Unix functionality in MPE IX and is considering using non-HP equipment running Unix.

The annual survey, which was sent this year to 3,200 IS managers, garnered responses from 820. Together they spend \$945 million annually on information technology.

Whirlwind of HP support woes spurs sales shake-up

BY MARK HALPER
CW STAFF

NEW ORLEANS — High winds were not alone in stirring things up at the Hewlett-Packard Co. user conference here last week, where rancorous user complaints of diminished support prompted promises from HP of sales force changes.

"I haven't even seen my systems engineer for eight months," complained Ed Harms, a data processing analyst at Florida Roofing, Sheet Metal & Air Conditioning Contractors Self Insurers Fund in Winter Park, Fla.

A survey of HP users, meanwhile, showed consistent concern among users about the vendor's lagging level of support

(see story and chart this page).

Manuel Diaz, HP's general manager of sales for the Americas, acknowledged HP's support shortcomings in a speech to about 3,000 attendees at the annual HP user group meeting. Diaz faulted HP for failing to tell users about a change made last year in which HP decided to sell to certain users via telephone and indirect channels rather than through the company's direct sales force (CW, Aug. 24).

Diaz outlined a plan calling for the direct sales staff to play a more active role in small to mid-



HP's Platt: Sales team to get involved in PC sales support

size accounts.

Among the sales force changes that will mark the beginning of the Lew Platt era is a plan to form an integrated sales team that will dispatch direct sales staffers to accounts that now deal only with indirect or phone sales contacts.

Platt, who heads HP's computer operations and will take over for John Young as chief executive officer in November, outlined other forthcoming changes last week. One plan called for HP to increase personal computer sales by increasing the involvement of its

direct sales team in the company's PC business. Currently, the direct sales team is geared toward the reseller channel.

HP, which has been riding a wave of success in the minicomputer and workstation business, is often criticized by industry watchers for its relatively lackluster performance in the PC business with its Vectra line.

Honing in

While stopping short of agreeing with that assessment, Platt said in an interview last week, "We recognize that PCs are a very important client in the overall client/server scheme. We're going to involve the direct sales force more in the sales of PCs."

He said HP will tap the direct force for PC sales to "a select

HP to cut prices

HP is turning up the volume on its PC division, which until now has been a low-profile part of the company.

The company is expected to finally respond tomorrow to the industry price wars that so far have roared past it, announcing cuts of up to 26% on its entire family of Vectra PCs. A diskless 386 25-MHz machine will be offered for \$999, while the company's 33/66 DX2 offering, now shipping, starts at \$3,649.

Boris Elisman, product manager for the North American Personal Computer Division, said HP plans to pursue the PC market more aggressively. Other executives outlined plans to step up the use of HP's direct sales team to sell more PCs (see story at left).

Elisman said sales have increased 50% since May 18. International Data Corp. estimated that HP shipped 123,000 units in the U.S. last year, including single-user workstations.

John Doktor, chief of information systems at the Los Angeles Municipal Court, said the new prices certainly affected his purchasing plans — he switched vendors. "We're moving to Vectras because of the prices. We're getting HP 486s at the cost of the others' 386."

CAROL HILDEBRAND

group of major accounts" rather than relying on sales representatives to sell pervasively to the whole PC market.

"We're not going to have them running all over the place," Platt said.

Compaq creates elbow room with release of printer line

BY CAROL HILDEBRAND
CW STAFF

NEW YORK — Compaq Computer Corp. will make its first attempt today to elbow its way into the crowded printer market when it shows the first two offerings in what it said will be a comprehensive product line.

Pagemark 15 and Pagemark 20 are network-ready printers that will print between 17 and 20

page/min., including 11- by 17-in. pages, according to sources close to the company. Pricing is about \$3,995 and \$5,995, respectively, which analysts said is very aggressive for that printer class.

As part of its bid to offer one-stop shopping, Compaq will market the printers using a "hassle-free printing" marketing strategy, sources said. The machines offer support for Token Ring,

Ethernet and Apple Computer, Inc.'s AppleTalk.

The printers also have both PostScript Level 2 and PCL fonts preloaded, as well as a feature called terminal-emulation sensing, which Adobe Systems, Inc. developed for Compaq. It automatically switches between the two font types, sources said.

An internal fax modem on the printers also allows users to send faxes from the printer, and print enhancement technology will enable users to print at either 300 by 300 dot/in. or 800 by 400 dot/in.

Analysts said that if any company has a chance at breaking

Hewlett-Packard Co.'s hammerlock on the corporate printing market, Compaq does.

Rob Auster, an analyst at BIS Strategic Decisions in Norwell, Mass., cited the firm's strong dealer channel and expertise with networking as strengths of the new printers.

However, he said he expects Compaq to move away from networking and open up the line to be competitive with HP's offerings.

"Compaq has done their homework," he said. "HP is now going to have to respond to that. This is the first time that HP has been outjumped in printers."

CORRECTIONS

In "New DX2 systems enter PC fray" (CW, Aug. 17), the chart showed an incorrect price for the Compaq DeskPro 4/661 Model 120.

The correct price for the model is \$2,749.

Electronic Data Systems Corp. did not buy an equity stake in National Car Rental System, Inc., as was reported in "Budget remaps outsourcing plan" in the Aug. 17 issue. It did, however, purchase all of National Car Rental's hardware and software.

"THE TASK IS TO INTEGRATE THE OLD AND THE NEW."

Hellmuth, Obata & Kassabaum Architects

To a great extent, the day of the bulldozer is over.

Buildings, like the historic St. Louis Union Station, are saved. And made even more valuable by putting them to new uses. Architects call it "adaptive re-use."

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CLIENT/SERVER ARCHITECTURE FOR THE ON-LINE ENTERPRISE

Big Blue fights AS/400 mid-life crisis

CONTINUED FROM PAGE 1

an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

Although the AS/400 continues to sell briskly — revenue was up 20% in 1992's first half compared with 1991 — the pace may level off by 1994 unless IBM can improve price/performance of the line, IDC analyst Steve Josslyn said.

Tomorrow's products "are really just fillers, but IBM has to make announcements often to reassure people that there is

IBM declined to say which RISC chips might power future AS/400s, but according to analysts, using the forthcoming PowerPC architecture would be wise. IBM is currently working with Apple Computer, Inc. and Motorola, Inc. to develop the PowerPC chip family.

However, some users said they want AS/400s to talk to IBM's Unix systems right now.

Atlanta-based Equitable Real Estate Investment Management, Inc. is looking to replace

division to roll out RAID systems. "ABS is a test bed for new technologies," Josslyn said, adding that IBM's first 16M-byte chip debuted on the midrange line.

Users lukewarm

Test bed is the right description, judging from underwhelming user response to news of AS/400-related RAID products. Users such as Deans & Homer Insurance in San Francisco are content with disk drives for the short term.

"I see the value of [RAID], but the high cost outweighs that value," said Jerry Murphy, data processing manager, echoing sentiment from several users interviewed last week.

Meanwhile, although faster boxes are always welcomed, the market for the high-end E95 is limited, according to Gannon.

"The real growth opportunities are in migrating the users of smaller models, such as low-end AS/400s, upward," she said. IBM recognizes that jewel and is grabbing for it with pinpoint marketing plans.

In fact, observers said, the AS/400 owes its success largely to cunning marketing tactics from ABS. Consider the following:

• **Prepackaged goods.** ABS has invented sales programs aimed at small to medium-size businesses with relatively little computing know-how.

For example, Plug-n-Go systems consist of discrete vertical market-oriented programs preloaded on 9402 and 9404 models, while Migrate-n-Grow caters to System/36 and System/38 users looking to up-

grade to AS/400s.

• **Alternative distribution.** IBM recently signed up three regional distributors — Arrow Electronics, Inc., Sirius Computer Solutions and Support Net, Inc. — to find and contract

smaller resellers for low-end AS/400 machines.

A two-tiered take on distribution is not new — rivals Hewlett-Packard Co. and DEC use the method — but IBM has honed it to the low-end part of the AS/400 family instead of applying it to the whole line.

"They've carefully decided which customers to go for and are attacking," Josslyn said.

IBM to announce AIX software, new RS/6000s

BY MARYFRAN JOHNSON
CW STAFF

The Unix contribution to IBM's September product bonanza will underscore the importance of commercial transaction processing environments. On Sept. 22, IBM will announce a slew of AIX Unix-based software and at least three new models of the RISC System/6000, sources close to the company confirmed last week.

"This is going to be a pretty big announcement. It will definitely make AIX a more strategic product for them," said one commercial user who asked to remain anonymous. "It's an acknowledgment that they're shipping more units into the transaction world than into the engineering world."

Analysts and users familiar with IBM's product plans are expecting the following introductions at Unix Expo in New York:

• **Availability dates and details** about the AIX version of CICS, the Customer Information Control System that is IBM's mainstay transaction processing system and a key database access

tool in mainframe environments.

• **New distributed processing software** for clustering RS/6000s, allowing users to run programs in multiple places while keeping close track of them.

• **More specific time frames** for delivery of the AIX database product, which will reportedly replace OS/2's Data Manager and provide a common database environment for AIX and OS/2.

• **Additional computer-aided software engineering tools** that operate in either database environment, which analysts said signals the eventual merging of OS/2 and AIX development efforts.

• **A new low-end RS/6000**, a midrange model and a topper for the current high-end RS/6000 Model 970. Analysts said they expect IBM to pump up the current 50-MHz clock speed to the 100-MHz chip speed coming in mid-September from competitor Hewlett-Packard Co.

"Basically, IBM will be exposing its enterprisewide client/server strategy," said Marc Schulman, president of Technology Strategies Group, Inc. in Stamford, Conn.

Bright spot

The AS/400 continues to shine in a dimming market

Worldwide installed base					
	1988	'89	'90	'91	'92*
IBM AS/400	27,100	60,500	113,850	166,241	216,256
HP 3000	35,450	42,580	50,185	59,865	69,876
DG Eclipse	22,557	27,195	29,525	30,164	29,162
DEC VAX	275,449	387,244	450,711	498,891	523,600

*estimated

Source: Computer Intelligence/InfoCorp

CW Chart: Janell Genovese

room to grow within the product line," Josslyn said.

IBM has been providing such reassurance, but it may have to appease users more often to combat stepped-up marketing efforts from Unix vendors, he explained.

Real performance pops will appear during 1993's first quarter, when IBM plans to refresh the line with a next-generation F series family. Analysts speculated that the F models will contain hooks from the proprietary OS/400 operating system to reduced instruction set computing (RISC) features.

an older Wang Laboratories, Inc. system with an AS/400, mainly because the firm's applications run on that platform and not on the RISC System/6000, according to Robert Matthews, senior vice president.

Equitable runs an IBM 3090, a network of 20 RS/6000s and about 1,000 PCs. "One of our concerns is, how does an AS/400 fit into what we're moving to in the open environment?" Matthews said.

IBM's Application Business Solutions (ABS) group, which controls AS/400 development and marketing, is the first IBM

IBM front-end processor set for peer networking push

BY ELISABETH HORWITT
CW STAFF

IBM will make multiple efforts next month and later this year to ensure that users do not abandon their trusty 3745 front ends when they start migrating to IBM's "open" Advanced Peer-to-Peer Networking (APPN)-based architecture.

IBM first unveiled the architecture last March, billing it as the future de facto standard for multivendor enterprise communications. Its keystone is the APPN network node, which will coordinate communications across the enterprise between devices running IBM Systems Network Architecture (SNA), Transmission Control Protocol/Internet Protocol, Open Sys-

tems Interconnect and Novell, Inc.'s IPX, IBM said.

IBM is expected to prepare the 3745 for the role of APPN hub with the announcement of Network Control Program Version 6.2 with APPN network node support on Sept. 15, according to Richard Boyle, a program director at Gartner Group, Inc. in Stamford, Conn.

Frame expectations

At the same time, IBM is expected to announce frame-relay switching capabilities for the 3745. Previously, IBM had announced frame-relay direct terminal-emulation support, which allows the 3745 to access a carrier's frame-relay services, an IBM spokesman said.

As a frame-relay switch, the

3745 will be able to efficiently handle bursty, high-speed traffic as well as route a variety of local-area network protocols. Both of these capabilities have long been demanded by customers who want to interconnect their LANs over their IBM SNA backbones, which nine out of 10 IBM customers do, according to Boyle. However, the price for the necessary hardware and software enhancements could be high, Boyle said.

CSX Corp. is one company that "buys the concept" of APPN, according to Doug Underhill, an assistant vice president at the transportation firm. Underhill said he initially envisioned using IBM front ends as an APPN backbone, then moving gradually to router-like APPN nodes that would interconnect a local group of LANs or devices to the rest of the enterprise. The nodes would talk directly to one another, eliminating the need to route traffic through a central

front end, he added.

The 3745 will have a lot of competition for the job of enterprise LAN switch — particularly from vendors such as Cisco Systems, Inc. that plan to implement APPN Network Node on their devices, sources said.

SNA considerations

A. Duda & Sons, Inc. will consider using SNA backbones to interconnect its LANs after reviewing other solutions, said Alan Newton, director of information systems at the Oveido, Fla., agricultural business. However, A. Duda & Sons may not wait for IBM's rollout: The firm is now testing Memorex Telex NV's 9430 Enterprise Gateway to link Novell NetWare LANs to an IBM 3081 mainframe (see story page 10).

Other IBM announcements that are expected either Sept. 15 or in the next couple of months include the following:

• Product details on the recently

announced joint development and marketing agreement between IBM and Chipcom Corp. The agreement should build on Chipcom hubs that interconnect Fiber Distributed Data Interface, Token Ring and Ethernet products in areas such as Asynchronous Transfer Mode switching, bridging and routing and network management by IBM products, a source close to IBM said.

• **Distributed Systems Management**, a framework for running LAN management applications that will be based on IBM's SystemView architecture and run on OS/2 2.0 systems.

• **Configuration, installation and distribution software** that will work with IBM's mainframe-based Distribution Manager to coordinate the downloading of software updates to OS/2-based workstations.

Correspondent Thomas Hoffman contributed to this report.

'New' IBM sets revamp

CONTINUED FROM PAGE 1

is more internal competition, more freedom for the AS/400 salespeople to go after mainframes and for the workstation people to go after the AS/400. It's much more so than in the past, when IBM would try to sell customers the highest cost and most proprietary solution."

Still, customers may not entirely welcome some by-prod-

ucts of this independence. The days when users had a "high dependence on IBM for understanding the industry" are over, said Frank Gens, an analyst at Technology Investment Strategies Corp. in Framingham, Mass. "Customers will just have

to pay more attention to the overall trends in the market," he said.

Another question is just how well the interdivisional warfare will turn out longer term. "If everyone is on their own, how does each individual agenda really help IBM?" one software company executive said. "As they break apart, will they be able to achieve a cohesive strategy for

the company?"

An IBM spokesman said there are still some corporate structures in place to make sure havoc does not reign. "The Balkanization of IBM should not be presumed," he said. "There is still an overriding IBM corporation that all lines of business report to and through."

Among these structures, he said, is the Corporate Manage-

ment Board, which meets monthly. Some 24 executives discuss cross-organizational issues.

To some observers, the new model makes sense, despite whatever dangers lie ahead. "After all, how successful was IBM before at accomplishing its grand schemes like AD/Cycle?" said Phil Reuppel, an analyst at Sanford C. Bernstein & Co.

Face-lift for IBM's PS unit

The changes looming next month for IBM's Personal Systems Division are more than cosmetic — they amount to an entire face-lift.

Caught between an inflexible corporate parent and a PC price war that demands hair-trigger responses, part of the Personal Systems Division will secede from IBM proper on Sept. 3, sources said.

The new entity will include several divisions, each dealing with a separate market including notebooks and mobile systems, PS/2s, PS/1s, software and services. It will not include the RS/6000 line of workstations or OS/2.

Its day-to-day operations head looks to be Robert Corrigan, currently the Entry Systems Division vice president, who will report to James Cannavino, the de facto chairman.

The new group will stake its claim in the PC hardware market almost immediately, announcing new, more powerful PS/1s on Sept. 9. Less than two weeks later, on Sept. 21, the new unit will make a major PS/2 announcement that will include servers, desktops and notebooks as well as a new line of low-price PCs.

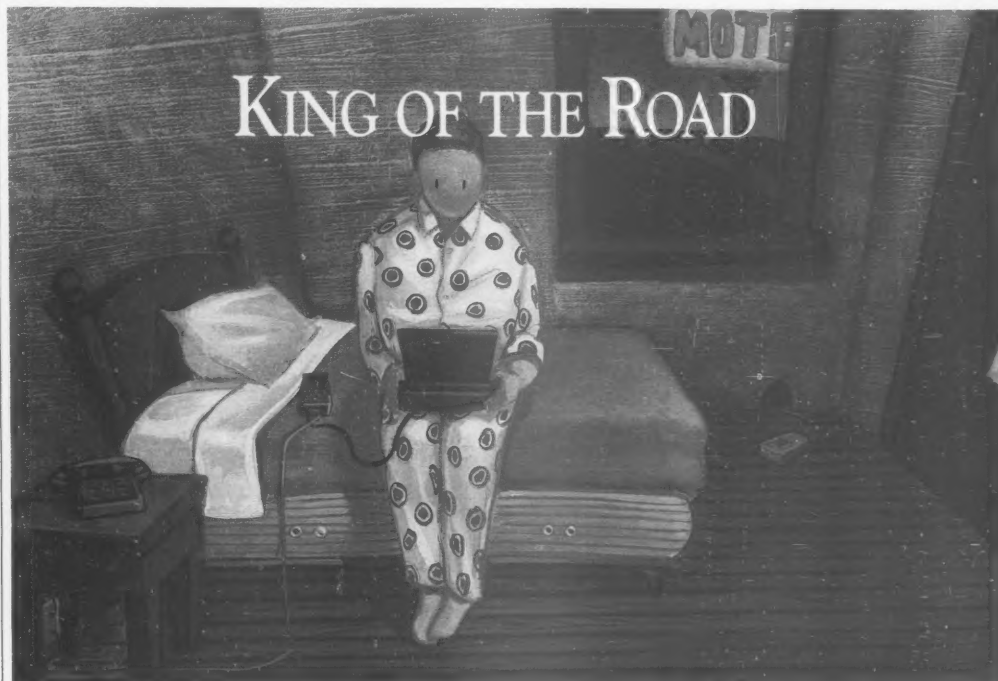
An IBM spokesman confirmed that new PS/1s were on the way, saying, "We intend to deliver a full family of PS/1 products in the very near time frame."

In fact, East Coast retailer Lechmere is already pushing the products. A 25-MHz 386SX with an 85M-byte hard drive, Video Graphics Array monitor and a slew of preloaded software, including Microsoft Corp.'s Windows, will cost \$1,299.

The Sept. 21 announcement will see IBM unveil an entire line of "entry-level" PS/2s based on the AT bus architecture, while it expands the Micro Channel Architecture-based current PS/2 line, as well as the notebook line.

IBM is also exploring mail-order and built-to-order PCs, which it could announce on the same date, sources said.

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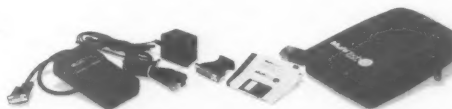
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NEWS SHORTS

Wang creditor commission named

IBM, Microsoft Corp., Chemical Banking Corp. and 10 other firms owed money by Wang Laboratories, Inc. were named to oversee the bankrupt company's Chapter 11 reorganization. The U.S. Department of Justice in Boston said last week that the so-called Creditors' Committee has the right to demand that Wang consult it before making major business decisions, to participate in restructuring Wang and to request that the court convert the Chapter 11 protection to a Chapter 7 liquidation proceeding. Wang said it will file a reorganization plan within 120 days.

Apple expands A/UX license

Apple Computer, Inc. last week upped the number of users able to access its A/UX 3.0 version of Unix from a single CPU with the announcement of a 32-user license. Previously, 16 users was the limit. A \$2,500 32-user license is now available.

Oracle plans MP server

Oracle Corp. and NetFrame Systems, Inc. plan to build a multiprocessor version of the Oracle Server for native Novell, Inc. NetWare environments on the NetFrame superserver platform. Parallel multiprocessing technologies will access up to five processors on the superserver. It will be rolled into Oracle 7 and should ship with NetFrame sometime in 1993.

Unisys cuts PC prices by up to 66%

Add Unisys Corp. to the list of vendors waging a battle in the personal computer price war. Last week, the Blue Bell, Pa., computer firm cut prices from 47% to 66% on its entire line of PW2 Advantage PCs, including storage devices, math coprocessors and printers. Unisys also added a new unit, the PW2 4256 PC, a 25-MHz desktop device based on Intel Corp.'s I486SX processor. It is priced at \$2,199.

HP utility speeds Windows access

Hewlett-Packard Co. last week announced Dashboard, a push-button utility panel that provides users with a speedier way to work with Microsoft's Windows. Dashboard appears at the bottom corner of a user's screen and features a series of quick-launch, push-button icons that can be customized like a car radio's preset buttons. Users can then launch applications in one easy step as well as organize program groups. Dashboard also allows multiple-screen views of programs. The retail price of the package is \$99.

Altima sues Nissan over name

A federal district court judge in Illinois has denied Altima Systems, Inc.'s request for a temporary restraining order, prohibiting Nissan Motor Corp. from using the name "Altima" on a new sedan slated to go on sale tomorrow. Altima, of Concord, Calif., filed for relief and damages last week against various Nissan entities, claiming that it has spent more than \$2.5 million since 1990 promoting its Altima trademark and computer line.

Short takes

ComputerVision Corp.'s parent company, **DR Holdings, Inc.**, filed for Chapter 11 protection following an impasse in negotiations between corporate partners that blocked reorganization of the firm. . . . A \$6 million donation from **Microsoft** founder Bill Gates will enable **Stanford University** to complete its information sciences building by 1995. The new facility, to be known as the Gates Information Sciences Building, will house several disciplines currently scattered across campus. . . . **Leading Edge Products, Inc.** lopped up to 30% off its product line and shipped its 486SX 25-MHz systems. . . . Next month, HP will cut prices for its EtherTwist family of 10Base-T hubs up to 17%, to less than \$80 per hub. . . . **Mario Morino, Legent Corp.**'s vice chairman and founder of predecessor **Morino, Inc.**, will retire Sept. 30, to pursue private interests.

AD/Cycle partnership in flux

BY JOHANNA AMBROSIO
CW STAFF

ROCKVILLE, Md. — Intersolv, Inc.'s announcement last week that it is pulling out of the AD/Cycle alliance it helped found is yet another sign of disarray in IBM's software development architecture, observers said.

"This speaks volumes about the lack of importance of AD/Cycle," said Stuart Woodring, an analyst at Forrester Research, Inc. "AD/Cycle has been in danger of being irrelevant for quite some time."

Still, the alliance will remain otherwise intact, with executives from four of the six remaining business partners saying that they are as committed as ever to the architecture. Indeed, as one partner was exiting last week, another entered: Sapiens International Corp., a Cary, N.C., vendor of object-oriented development tools, which is now the seventh member of the International Alliance for AD/Cycle.

Furthermore, observers said, IBM's announcements of AD/Cycle products for the local-area network and RISC System/6000 arenas, expected this fall, may inject some new life into the much-troubled computer-aided software engineering (CASE) framework.

"The Intersolv decision makes AD/Cycle unravel a little more," said Ed Acly, an analyst at Technology Investment Strategies Corp. in Framing-

ham, Mass. "But I really doubt if others will pull out — they're getting more marketing benefit than Intersolv was."

Executives from Digital, Inc., Bachman Information Systems, Inc., Synon Corp. and Micro Focus confirmed they are not leaving the alliance anytime soon. Arnold Kraft, president of Bachman, said, "We foresee staying with AD/Cycle as long as it continues to meet customers' needs. Right now we're comfortable with it."

Only one other alliance vendor has left the coalition to date: Systematica Ltd., which filed for receivership in the UK earlier this year. Receivership is the British version of Chapter 11.

Unfinished business

AD/Cycle was introduced in September 1989 but has only a handful of corporate customers because a key component has not been finished. Repository Manager/MVS was supposed to act as the central control point for mainframe applications development.

Although there have been three releases of the Repository Manager, one important piece — the design portion of the Information Model — remains to be completed. The problem was essentially in designing a very complex piece of code, complicated by all the input from and to the business partners, as well as by performance issues.

Catherine Lewis, IBM's di-

rector of application development marketing, said that by year's end the design portion will be finished enough so that the entire Information Model can finally be incorporated into products.

Lewis also said that although IBM will refocus AD/Cycle to work with nonmainframe platforms, the Information Model "is a critical component of both" the old and new AD/Cycle environments. She added that no "substantial" recoding effort will be necessary to get existing AD/Cycle tools to work on the workgroup platforms.

"We will put an object layer on top," and that will require the business partners to do some re-writing of the tools to make them work with objects, Lewis said. "But the look and feel of the tools will be the same, and the customer investment will be protected."

Lewis waffled on IBM's long-range plans for Repository Manager/MVS. She said there are no immediate plans to withdraw the mainframe-based product from the market but did not deny that new releases may not be forthcoming. "Clearly, workgroup support is at the top of customers' requirements," she said. "Things sometimes go away because customers no longer want or need them."

But, Lewis said, IBM plans to merge "the two worlds of LAN and enterprise-level control. One size does not fit all."

High costs cause Intersolv to leave IBM CASE venture

BY KIM S. NASH
CW STAFF

ROCKVILLE, Md. — Intersolv, Inc.'s exit from IBM's AD/Cycle computer-aided software engineering (CASE) partnership last week was driven by the "enormous" expense of the IBM stamp of approval, a company executive said.

The CASE vendor's participation in the alliance cost the company \$6 million in revenue because IBM got a piece of every Intersolv sale regardless of whether the AD/Cycle angle helped close the deal, according to Chief Executive Kevin Burns. By leaving the AD/Cycle partnership, Burns said he expects to boost the firm's revenue by \$3 million to \$4 million.

Several Intersolv users applauded last week's separation, saying they bought Intersolv's products for functionality, not the IBM halo. Plus, they just do not buy IBM's approach, they said.

"I say, 'Good for Intersolv,'" said Richard Lansing, vice president of technology at Chemical Banking Corp. in New York.

Lansing said he likes the AD/Cycle premise: a development framework that lets tools from different vendors cooperate. But the scheme's historic dependence on a mainframe-based repository does not jibe with his plans to shift CASE to local-area networks, he said. IBM's stated intention to build a LAN-based storehouse will not yield a product in time for Chemical Bank, Lansing said.

Missed opportunity

"IBM missed a great opportunity to take advantage of technology that Intersolv already tackled, but IBM went its own way, of course," Lansing said.

However, Lansing and other users said they were relieved to hear Intersolv's promise of continued compatibility with IBM products such as DB2.

"As long as their stuff works

with IBM's, then I see no big deal" with Intersolv leaving the AD/Cycle fold, said Diane Weir, staff member at the Los Alamos National Laboratory.

Burns said the two companies have not severed technological ties. Intersolv will still receive early access to future IBM offerings, he added.

Discord between the vendors may have caused the separation, noted Ed Acly, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

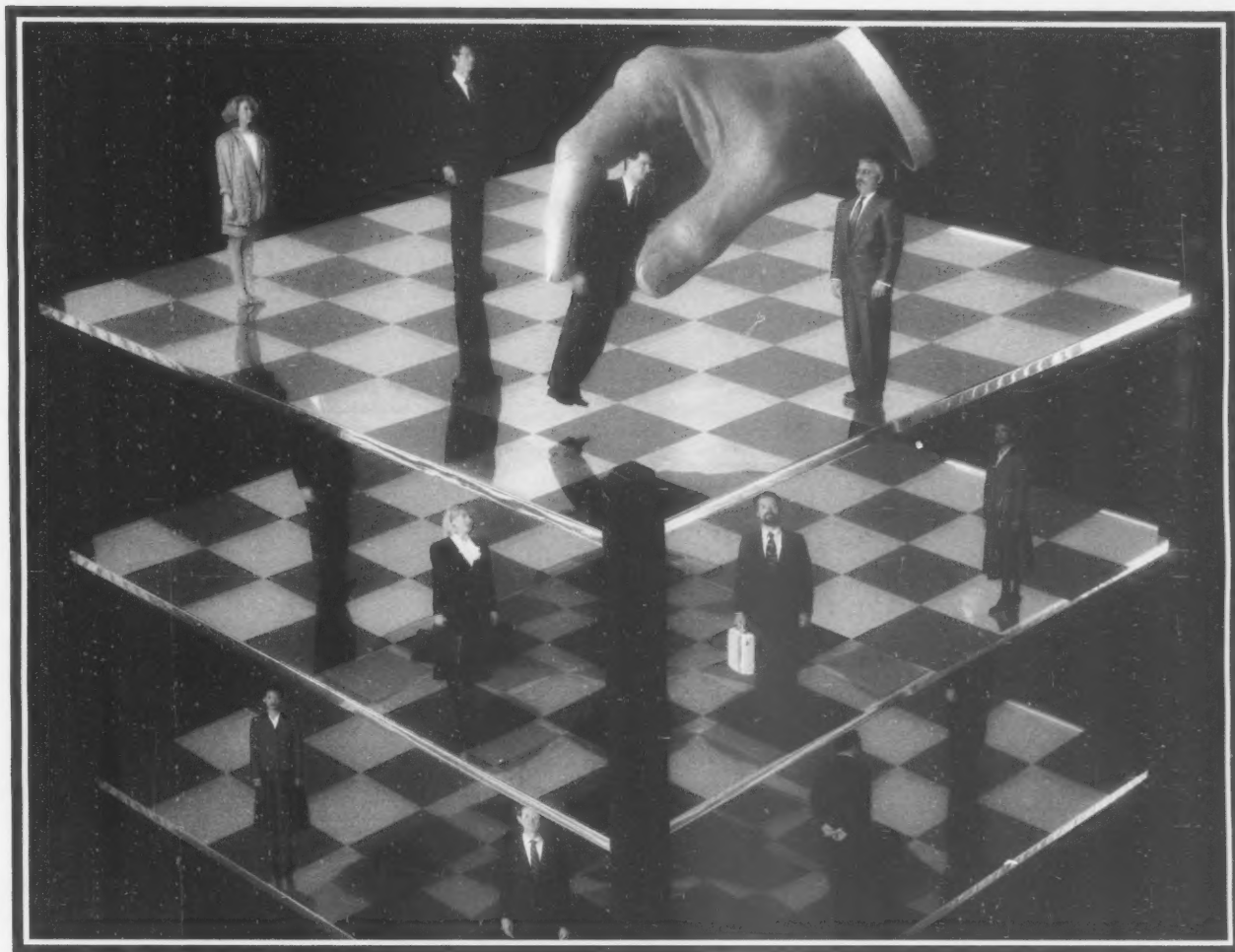
Burns said the relationship between IBM and Intersolv's 120 salesmen was "unnatural. We value our independence."

For instance, Excelsior II, a full life-cycle workbench, began shipping in May, replete with a LAN-based repository, something IBM has talked about but not delivered.

Furthermore, APS, Intersolv's code generator, threatens IBM's generator, Cross System Product (CSP), he said.

IBM, meanwhile, denied any rivalry. "We certainly did not see the competition between APS and CSP," said Catherine Lewis, director of application development marketing.

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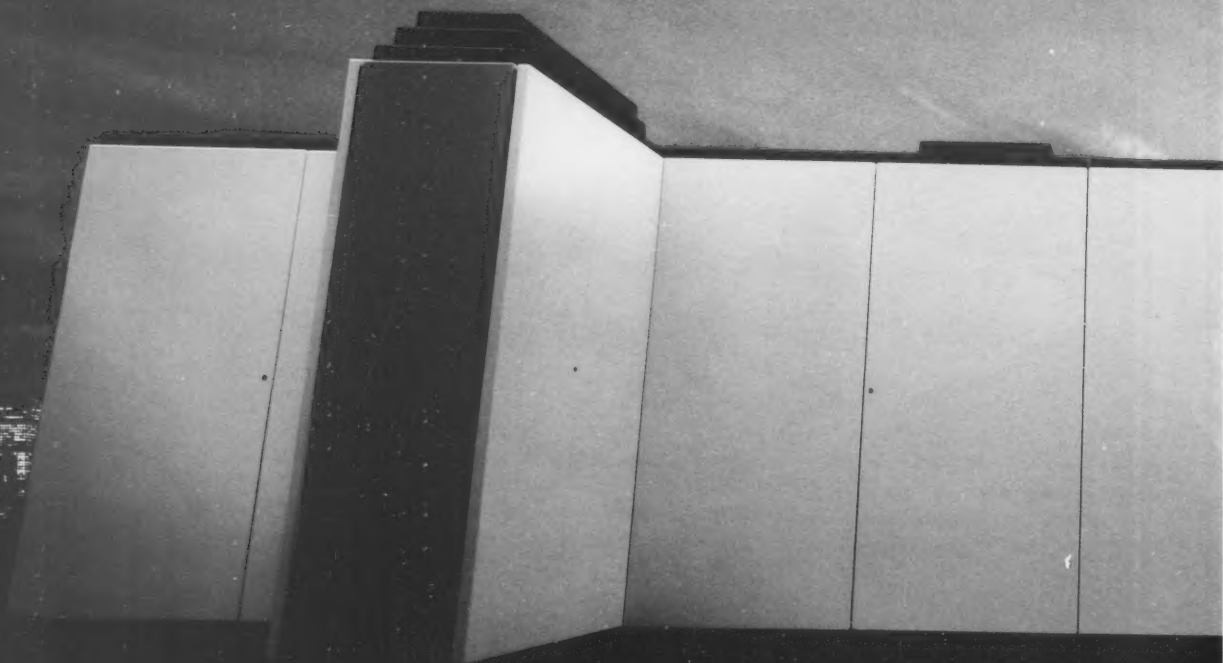
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Mellon slaps exec with lawsuit

CONTINUED FROM PAGE 1

term data processing contract with National Steel Corp. that is estimated by analysts to be worth \$200 million to \$400 million — the outsourcing arm's biggest deal to date.

The National Steel deal, noted Susan McGarry, an analyst at Boston market research firm The Yankee Group, is "a real coup" for the Mellon outsourcing group.

The latter's viability was reportedly under review after the bankruptcy of its then-largest outsourcing client, Dollar Dry Dock Bank, earlier this year [CW, March 2]. The Dry Dock outsourcing arrangement is being dismantled, a Mellon

spokeswoman confirmed last week.

The National Steel contract "is an important affirmation of our outsourcing capabilities," said Allan P. Woods, executive vice president of Mellon's Financial Institution Services Division.

Changes all around

In addition to his duties at the helm of the outsourcing division, Woods also heads into this week as steward of part of Shah's corporate empire.

In an internal memorandum due to be released today, the bank announced a reorganization of its Technology Products

and Services Department, which includes Cash Management, Network Services and Information Management & Research. The latter two divisions will report to Woods, as will Shah's replacement.

George DiNardo, former Mellon IS chief and now head of his own consulting and investment firm, described Woods as "not so much a technician as a world-class marketer — a good man, and a good company man."

Shah, according to the charges detailed in Mellon's complaint, jockeyed himself into a position at the heart of the bank's strategic IS operations last March ostensibly to serve Mellon, but actually to help himself.

Shah bolted from the bank to set up

Philadelphia-based bank transaction processing services firm Transaction Processing, Inc. Joining Shah two weeks later were other strategically key Mellon IS players:

- Network Services Division (NSD) manager Janet Hartung, whose responsibilities ran the gamut of the pivotal NSD's financial, technological and strategic activities.
- Senior NSD manager Elizabeth Costa, who ran the division's strategic development and financial analysis department.
- Senior NSD manager Paula Kramer, who was involved in the planning and implementation of marketing across a broad range of transaction processing activities.
- Senior NSD manager Gary Staub, a specialist in merchant payment systems.

DiNardo said he thinks Shah undertook his job at Mellon in good faith. Even during so short a tenure, "Bipin made a number of organizational changes," he noted. "He wouldn't have done that if he hadn't been serious about the job."

Shah could not be reached for comment at press time. He is expected to file his reply in approximately three weeks.

Mellon said it may file additional suits and/or amend its complaint to include further charges and defendants.

Meanwhile, observers agreed, both the upbeat and downside doings at Mellon are likely to have ongoing ramifications.

The National Steel contract, noted DiNardo — under whose stewardship outsourcing negotiations with the steel company kicked off — points toward a rich vein of future deals.

"MIPs rule," said DiNardo, dismissing the idea that it takes such 'extras' as software development aspects to make an outsourcing deal sexy. "This is where the untapped potential of outsourcing lies: You take your commodities and throw them onto someone else's iron." Mellon's, for instance. "This is a grand approach throughout Rust Belt America," he added.



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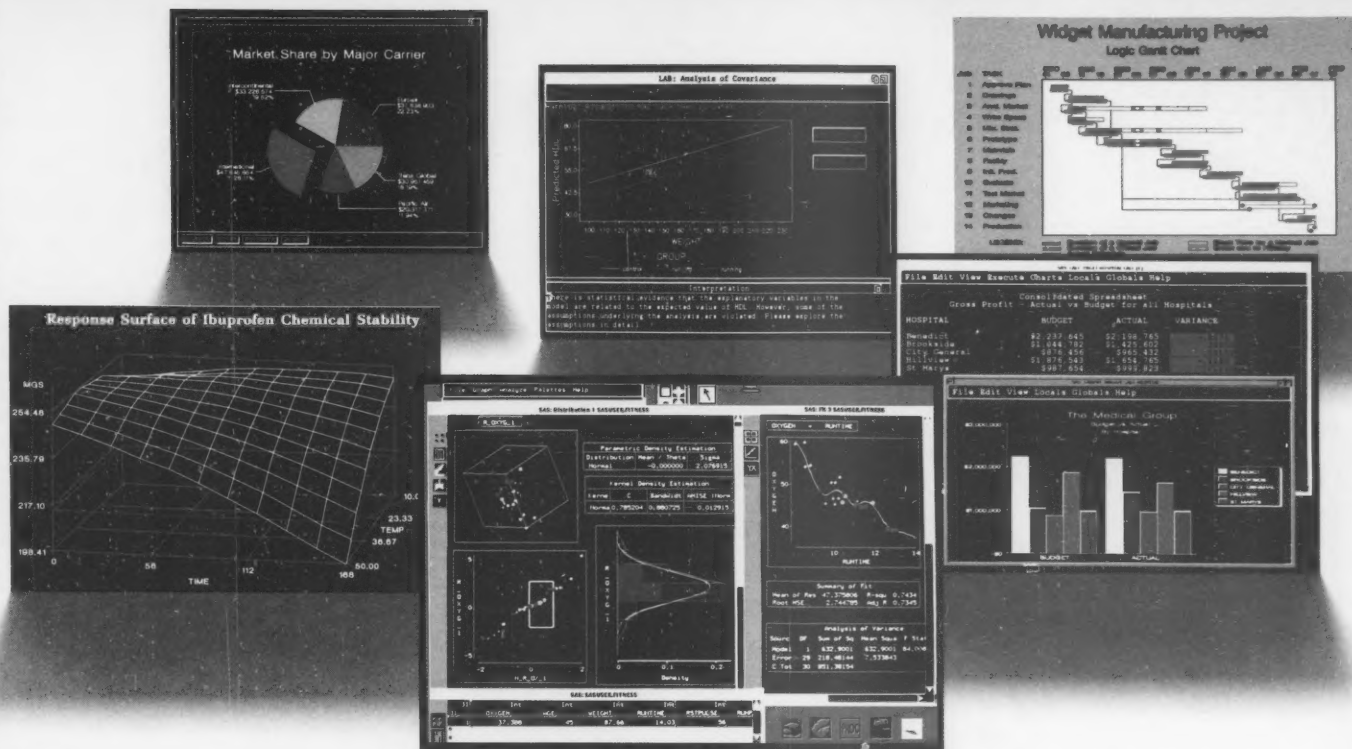
ROCHESTER, N.Y. — Eastman Kodak Co. last week beefed up its Photo CD product with the announcement of several applications targeted at business users.

First described two years ago, Photo CD offers camera owners the option of "printing" their photographs on a compact disc for later viewing and editing on either a television or computer monitor. Business applications include presentation graphics and document imaging.

According to Kristy Holch, director of scanner market strategies at BIS Strategic Decisions in Norwell, Mass., Kodak has been introducing pieces of Photo CD technology since 1990. But she said the technology, available to photo finishers for some time and only now hitting the consumer market, has lacked third-party software. "To fill the void, Kodak has come out with its own applications."

Kodak also announced a new business unit, Kodak Picture Exchange, that will provide on-line image databases. Kodak said it would sell its color printer technology to Apple Computer, Inc. and that future Apple systems will be able to read Photo CD discs.

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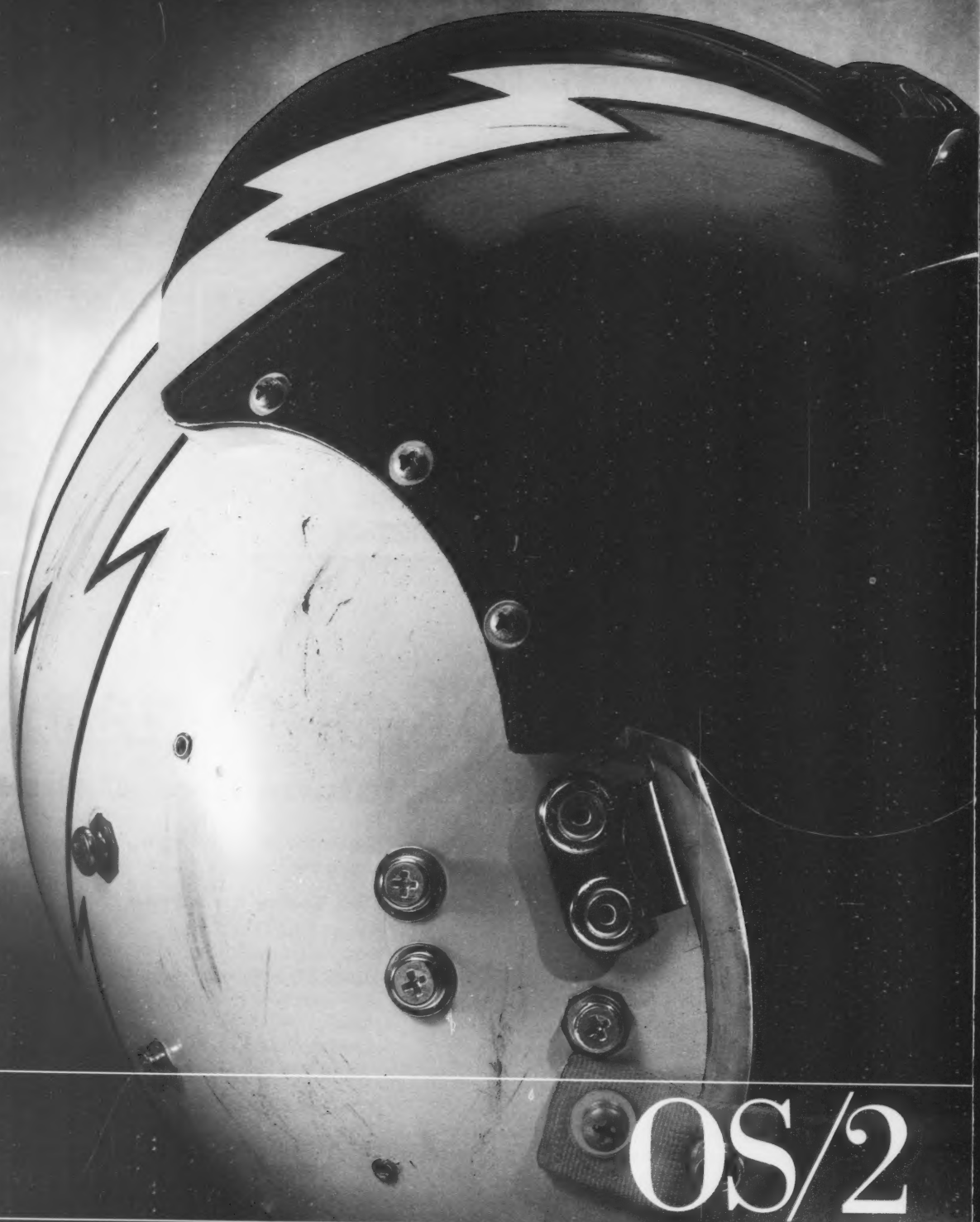
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Oracle unveils text-retrieval software pack

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — Oracle Corp. announced last week a text-retrieval software package that neatly dovetails with its Oracle 7 relational database. SQLTextRetrieval Version 2.0, written for some of Oracle's largest database customers, including BT, uses Oracle 7's Bi-

nary Large Objects (Blob) support to store images along with the text.

The Oracle product is an enhanced version of a SQLForms 3.0 utility called SQLTextRetrieval Version 1.0, which developers use to document changes in code.

About 100 of Oracle's large users applied the utility to corporate text applications but experienced performance problems when the text database exceeded 1G byte in size. To boost performance, the text database was stored outside the Oracle database, often on a hard disk.

Version 2.0 of the product solves these problems by using Oracle 7's Blob capability to store the text as a set of binary 1s and 0s. A special index reduces system overhead, while a compression feature

squeezes text into a fraction of the database space.

"Filters" for standard personal computer word processing packages allow most PC clients to access the text-retrieval system. Oracle 7 users will be able to "browse" through networks for remotely stored documents, said Richard Barker, senior vice president of Oracle's UK-based European development center. Oracle 7 is expected to be in wide use sometime next year, observers said.

Industry analysts said the product is part of Oracle's multimedia strategy, which includes a forthcoming set of graphical tools. "Oracle wants to provide flexibility for developers of client/server applications who want to move into new data types," explained John Morrell, a se-

nior analyst at International Data Corp. in Framingham, Mass.

Users of Version 1.0 will receive Version 2.0 free, Oracle said; new users will pay 30% of their Oracle database license. The package is available now.

Symantec steps up antivirus support

BY JAMES DALY
CW STAFF

SANTA MONICA, Calif. — Symantec Corp. moved last week to help users battle the increasingly complex and shifting problem of fighting computer viruses with the introduction of three new defensive support services.

The trio includes the AntiVirus Update Service, a package designed to keep users up to date on the latest viruses; the Norton Virus Scan, a DOS-only version of The Norton AntiVirus 2.0 that will be available for free on major bulletin board systems; and the Corporate Support Program, which provides an expansive educational and technical foundation as well as access to an antivirus emergency response team.

The core of the AntiVirus Update Service, which costs \$69 a year, consists of quarterly virus definition reports containing information for detecting and repairing damage from newly discovered viruses as well as improved definitions for existing viruses.

Protection by scanning

The Norton Virus Scan allows users to easily add basic virus detection to their systems. The scan detects more than 1,100 known viruses, gives the user the option of removing infected files and scans both local and network drives. The technology can be downloaded from many major bulletin boards, including Symantec BBS, CompuServe and Internet.

Virus Scan users who wish to add repair and other capabilities can upgrade to the full version of The Norton AntiVirus 2.0, which sells for \$129.

For more comprehensive protection, Symantec will also offer the Corporate Support Program. The package offers technical support services that include assistance from senior support engineers via a toll-free number, access to an on-call Virus Response Team, monthly virus update disks and evaluation of suspected virus samples.

Pricing is based on the size of the user's configuration, but the cost per unit will average less than \$20, and substantial price breaks will be given to sites containing 2,000 or more personal computers, according to a company spokeswoman.

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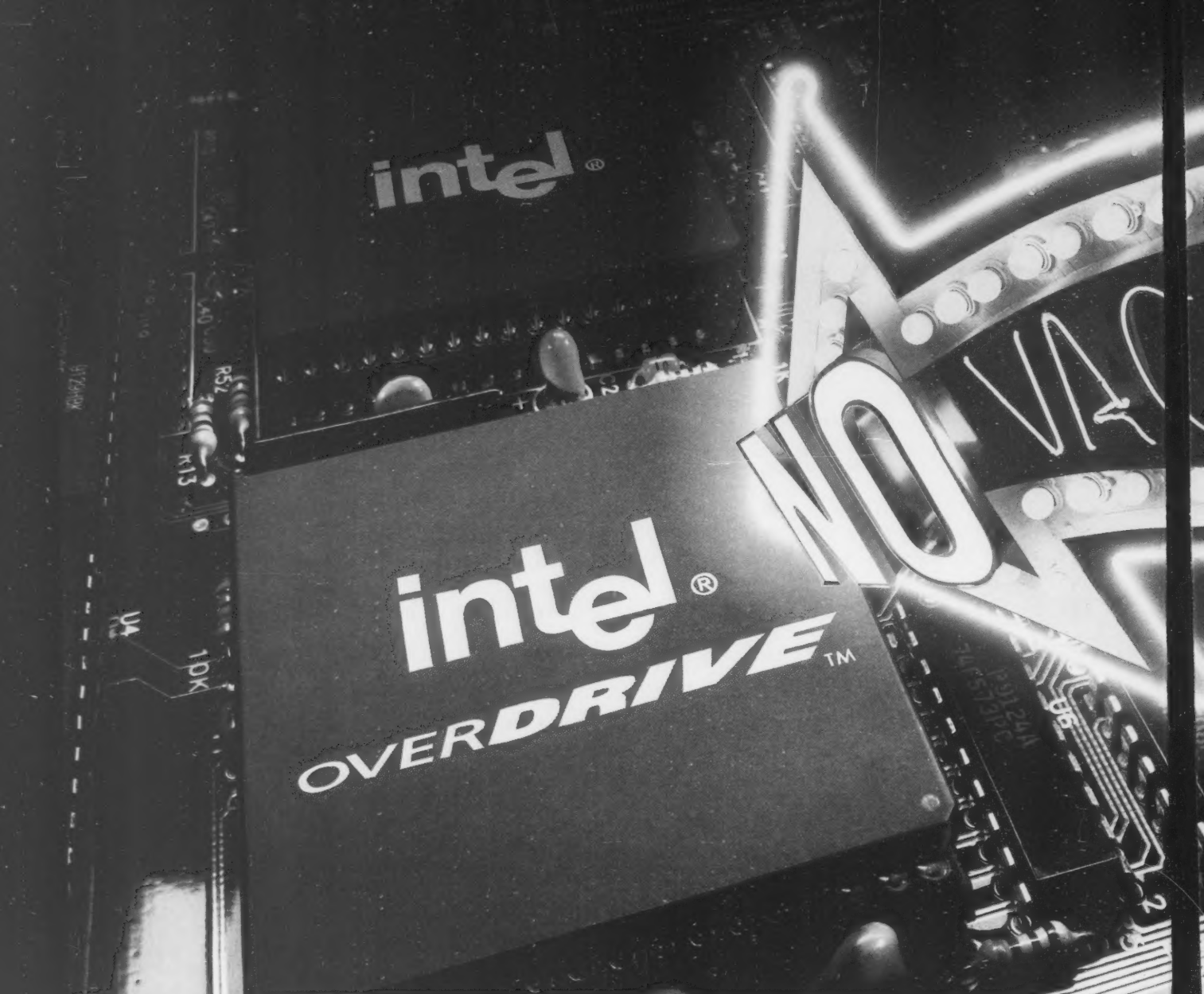
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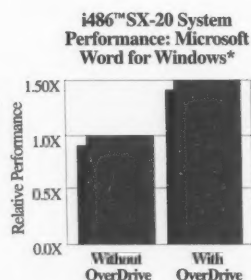
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TECH TALK

Storage advance

■ AT&T Bell Laboratories demonstrated a magneto-optic drive technique that can cram 45 billion bits into 1 square inch. The approach uses near-field scanning optical microscopy and is able to write and retrieve image bits with dimensions as small as 60 nanometers (about 1,000 times smaller than the diameter of a human hair). Bell Lab researchers said their technique, which offers nearly a hundredfold improvement over today's best commercial magneto-optical methods, could achieve drive densities of 200G to 500G bits per square inch.

DEC models molecules

■ Digital Equipment Corp. and Molecular Simulations, Inc. announced a strategic alliance to develop three-dimensional molecular modeling applications for DEC's new Alpha workstations and servers. Products from Waltham, Mass.-based Molecular Simulations already run on a host of supercomputers and high-speed workstations.

Supercomputer plans

■ Fujitsu Ltd. told the Association for Computing Machinery International recently that it intends to combine parallel processing and vector processing in a future line of supercomputers. Working with a prototype called the AP1000, Fujitsu said it achieved processing speeds greater than 300 billion floating-point operations per second.

Windows goes neural

■ UK-based Neural Computer Sciences has released a Microsoft Corp. Windows-based software package that provides a framework for creating neural networks. The product, called NeuDesk (\$695), provides a menu-driven guide through the process of creating neural networks, prompting for input parameters and output formats. It then "learns" by repeatedly running real-life sample data and modifying its behavior until it achieves a consistent result.

Fooling the driver's subconscious

Renault uses advanced graphics technology to conduct research on safe driving

BY MARYFRAN JOHNSON
CW STAFF

In the Paris suburb where French carmaker Renault SA tinkers with technologies of the future, the job of fooling the subconscious falls to Andras Kemeny and his network of Silicon Graphics, Inc. workstations.

Kemeny and his team of Renault researchers are coordinating a massive European project to make driving safer, using Silicon Graphics' newest graphics software to create highly realistic visual simulations of cars driving through traffic on a busy highway.

Seated in a Renault car in the darkened test room, the driver faces a large projection screen that becomes the three-dimensional highway. The driver can see the car next to him signal and change lanes. He can glance in the rear-view mirror at the simulated scene behind him. He can tap lightly on the brakes and slow down as another car cuts into his lane.

The point of generating such complex highway scenes is to test driver acceptance of real-time data exchange—via short-range radio communication—between the cars and outside devices such as electronic road signs and toll booths.

The trick is making this "cooperative driving" simulation appear so realistic that the test driver's subconscious is fooled into reacting normally.

Building that kind of reality can easily cost a company millions of dollars, but the trickle-down effect of advanced graphics technology at Silicon Graphics has made it possible for Renault to build its simulation environment for less than \$200,000.

"It's very tough to fool the conscious because you always know you're sitting in a simulator," noted David Hughes, manager of visual simulation at Silicon Graphics in Mountain View, Calif. "But when you fool the subconscious, it's close enough to react normally and get the right feedback."

Renault's research into cooperative driving is one of the main elements of the Prometheus project, a \$1 billion research effort funded by European Community governments and a consortium of major European car manufacturers. The project sponsors several streams of research devoted to safer driving and more efficient roadways.

"The auto market is changing very fast in Europe, and safety is becoming an important issue everywhere," Kemeny said. More research is focusing now on how to avoid accidents in the first place, he added, rather than simply protecting people from injury once a car crash happens.

Yet avoiding accidents requires information sharing, such as advance notice of icy roads or a warning signal that another car is in the driver's blind spot.

By the mid- to late-1990s, onboard systems providing such information to drivers are expected to be available from European carmakers, Kemeny said.

Three years ago, Renault established a Silicon Graphics workstation network called Scanner, for Simulator of Cooperative Automotive Network at Renault. Now grown to a half-dozen machines, Scanner enables Renault engineers to test their cooperative driving systems in various traffic situations.

type of system, that the technology will push the market."

"The hardware technology applied to graphics today is what we will see applied to general systems in a few years," said Ted Krum, an analyst at D. H. Brown Associates, Inc. in Port Chester, N.Y. "The really amazing thing about Reality Engine is that within a couple of years, the price will be much lower and mainstream customers can justify it."

Automobile design is another use some car companies are finding for ad-



This simulated highway scene enables Renault to test drive reactions to real-time data provided on road and weather conditions

The network is also used to perform vehicle control system tests, evaluate new instrument design and conduct worst-case scenario experiments under varying road conditions.

Initially, the Silicon Graphics hardware and software were not sophisticated enough to produce high-quality simulation. Yet Kemeny was patient enough to wait for the firm's Reality Engine graphics system, introduced last month and slated to be commercially available in September.

Priced from \$100,000, Reality Engine graphics consist of a three-board set for the Silicon Graphics Iris Crimson and Power Series systems. It provides interactive realism to users in application areas from scientific visualization and simulation to high-definition design and digital film production.

By making extensive use of Intel Corp. 1860 XP floating processors, Reality Engine provides a high degree of parallel processing that can support as many as 1,500 textures in every frame. It enables levels of scene complexity previously possible only on more expensive, proprietary systems.

"This is the first time SGI machines have the performance and the real-time quality that allows a simulation," Kemeny said. "I have the feeling, with this

vanced graphics and visualization systems. "People want to be able to build fewer physical models of cars, which is time-consuming and very expensive," Krum pointed out.

Building automotive simulators is even more complex and "more difficult than building a flight simulator," Kemeny said. "On a three-dimensional road, the dynamics are much more sophisticated. From a visual point of view, everything is close, so details are very important. The car is in real contact with the environment."

During the Renault simulation, data on speed, acceleration and traffic situation is transmitted to the driver through an Ethernet local-area network, which simulates a real radio communication system.

Reality Engine, which can produce a wide range of visual effects in software, can also split the data output into several channels to display on multiple screens. That gives the vehicle simulator the ability to provide side windows and rear window displays.

Another application Renault is working on would provide drivers with safety information through an onboard "heads up display," which might show up as a colored arrow on the windshield, indicating the distance to the other cars on the road.



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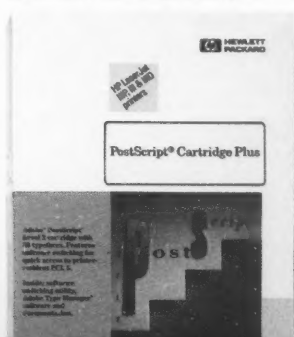
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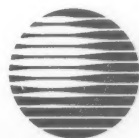
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EDITORIAL

Bewitched



Recently I took a slow and ever-so-sobering drive through my hometown of Salem, Mass. That pained excursion helped cement in my mind the importance of a national high-technology policy.

Incorporated in 1626, Salem is an old place, a city that at one time was one of the five busiest ports in North America. It's filled with architectural gems from the 17th and 18th centuries.

But on its outskirts stand the few remaining boarded-up tanneries, the ones that haven't burned. Those now-creaking hulks once teemed with immigrants and first-generation Americans, including my father and several uncles. The leather business has since gone south — all the way to Brazil and Argentina, cheap-labor havens whose governments have made it illegal to export untanned hides.

I also passed the enormous Parker Brothers facility, where scores of locals went to work making Monopoly, Ouija and other board games. It closed its doors too, when it was consumed in the corporate buyout mania of the 1980s.

There were two empty lumberyards and five boarded-up parochial schools. A car wash had replaced the old seven-story Owen Shoe Co.; 5-foot weeds grew where the sprawling Salem Shoe factory once stood.

Like I said, there are countries that won't let unfinished goods out and that make it very difficult for finished American products to get in.

I thought about Gordon Bell's provocative statements on a high-tech policy [CW, Viewpoint, Aug. 24]. I thought about our two presidential candidates' positions on the issue, on the same page earlier this month [CW, Aug. 10].

I also thought of what Roger Sippl, founder and chairman of Informix, said at a *Computerworld*-sponsored debate. Sippl said the government should simply make it easier for companies like his to get investment monies. They would do the rest, including creating hundreds of U.S. jobs. That's exactly what Informix did.

But, as Bell warned, should we reward high-tech companies that essentially act as distributors for foreign-made products? Like Apple, with its foreign-made PowerBook? Or DEC, with its plans to market Taiwanese-made PCs?

Should we instead make it more difficult (i.e., costly) to import high-tech products, screwing the customer in the process? What company or business will get fed by the Fed, and which will go hungry? Not only are there no easy answers; today there are no answers, period. Just politics.

The shabby ghosts of Salem's past, the empty few left standing, are silent indictments of failed industrial policies of the past. Yes, we need a high-tech policy, one that has at its heart the preservation and creation of jobs at home.

Bill Laberis

Bill Laberis, Editor in chief



LETTERS TO THE EDITOR

Old dog or new pup?

Kennelwood Village may have put Unix in the doghouse [CW, Aug. 10], but I suspect it is barking up the wrong tree.

Apparently it had grossly inadequate hardware for its application. Its old AT clone was a real dog when loaded with 175,000 records with access from multiple terminals. The newer, faster equipment it bought would have solved the hardware overload problem without replacing pedigree Unix with an offbred operating system. Sounds like it compared an old dog to a new pup, without checking out the breeding.

Its application software decisions were also of uncertain lineage. For example, why run FoxPro in DOS emulation? Both FoxPro and dBase are available in native mode Unix versions.

If it really wanted to put on the dog, it could go to one of the new RISC machines like IBM's RS/6000. Unix allows you that kind of upward mobility. Multiuser DOS lash-ups don't. Kennelwood settled for a mutt.

John R. Culleton Jr.
Sykesville, Md.

New 'Soviet' software initiative under way

Regarding "Programming perestroika" [CW, Aug. 3]: There is a project to seed a software industry in the Commonwealth of Independent States (CIS), advance the object-oriented art in the West and enable American software vendors to market integrated and complementary products.

The Manticore Eastern European Software Initiative will match the interests of CIS centers of competence in objects with the needs of Western firms that are undertaking advanced object-oriented analysis projects.

A cool \$1 billion nothing to freeze at

Using International Data Corp.'s survey [CW, "Frosted Storage Tek users to see Iceberg," Aug. 17], approximately 33% (7% plus 26%) of customers polled find Storage Tek's Iceberg product to be attractive and/or they would acquire/evaluate the product.

Assuming there are at least 5,000 Enterprise System/9000 and 3090 customers worldwide, if this survey is representative, then even at a minimum of one subsystem

per customer, 1,650 systems could be sold in 1993.

At a cost of \$1 million per subsystem, that's \$1.6 billion in sales. Even half that number would be \$800 million in sales, which is right on target with Storage Tek's first-year forecasted revenue for the product.

That wouldn't be too bad, would it?

Larry Thiry
Storage Technology Corp.
Philadelphia

Store data on server

Your article on downsizing titled "Getting down" [CW, Aug. 10] points out weaknesses in what you call the "Mainframe read/Serverwrite approach."

A variation on that theme that overcomes many of the weaknesses is to store the production data on the server (or multiple servers, if data is distributed across the company) and upload a mirror image of all or part of it to the mainframe periodically.

The server is used for data entry/validation and inquiries into individuals or groups of records, while the mainframe is used for corporatewide reporting.

The mainframe load procedures are simple: no complicated edits, just a straight load.

All mainframe reporting capabilities can continue to be used: executive information systems for top-level inquiry, and fourth-generation languages and Cobol for production reporting.

The other advantage of this approach is that historical data can be kept on the mainframe for reporting, while only current data is maintained on the server.

David L. Shapiro
DLS Associates
St. Louis

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor in Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.



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Feeling soaked by upgrades?

Users can and should demand protection from steady stream of new versions

JOE KING

As someone who has been using microcomputers for more than 12 years, I can remember the excitement of a long-awaited new release of a favorite software package. When a fresh version emerged after two or three years, I was always thrilled to see the long list of known bugs eradicated.

Now I'm a microcomputer manager, and new releases are no longer occasions for excitement. It isn't me that's changed. The industry has.

There is a disturbing trend emerging in the software industry: Vendors have discovered a tremendous new revenue stream in frequent upgrades, and they're making the most of it.

One major spreadsheet vendor will release no fewer than three upgrades in 1992. Retail outlets are dedicating sections of their stores to upgrades. Products are no longer known by their names alone: Almost all have a number as an important part of their identity.

The victims of this madness are the end users and support departments charged with implementing these upgrades. The benefits of keeping up are no longer worth the price.

A week per license

Several years ago, the Microcomputer Managers Association

released a position paper, titled "Corporate Buying Concerns," that pointed out the high cost in person hours to upgrade software products — approximately 45 hours for each license upgraded, when you count installation, de-installation, file conversion, testing and retraining.

That same paper pointed out that a major corporate-wide upgrade could take a year and upgrades were appearing in such quick succession that new ones

were sometimes announced before previous ones were completed.

That was in 1987. Now the situation is even worse. These days, Release 1.0 is commonly nothing more than an early beta-test version. We now see revisions that are "slipstreamed" into existence like a stealth bomber over Baghdad. There is no warning that they are coming, and they are potentially just as devastating to end users and



Janell Genovese

Outsourcing: One to do job, another to check it

LOUIS FRIED



Earlier this month, *Computerworld* reported on the recent Confirm reservation system debacle [CW, Aug. 10], which left Hilton Hotels, Marriott and Budget Rent A Car trying to salvage something from a \$125 million investment.

This is not the first time a major outsourced systems integration effort has failed; nor will it be the last. In fact, as applications expand in scope and integration becomes more complex, failures of multimillion-dollar development efforts seem to be occurring with greater frequency.

Such large development efforts are often put together by reasonable corporate chief executives who see a substantial business opportunity and who are

convinced by a vendor that there is minimal risk.

Technological naivete

Having read about triumphant downsizing projects and successful adoptions of client/server architectures, CEOs are all too ready to believe that the technologies are mature and safe. In many cases, they have also apparently failed to heed the warnings of their IS managers.

There are any number of reasons a CEO might ignore good advice and plunge into a contract of this type. He might doubt the credibility of his IS chief. He may feel that the internal IS group is composed of "techies" who can't see the big business picture. Or he may simply be enchanted by the "glamour" of the vendor.

Whatever the reason, these deals continue to be made, and the failures are bound to continue, unless something is done to

rectify the major flaw in most of these contracts — lack of oversight. Many of these disasters can be directly attributed to the failure of the customer to closely monitor progress of the project.

A good idea from DOD

Some years ago, the U.S. Department of Defense recognized a similar problem in its huge "outsourced" systems development efforts. As a result, the DOD made it a regulation that any programs it judged critical would have to be independently validated and verified by another contractor.

This contractor reports directly to the agency's contract manager and provides an impartial, technically qualified opinion in monthly status/progress reports and/or presentations.

I would be the first to agree that not everything originating from the government is a good idea, but this one has considerable merit.

The scope of verification and validation can vary from contract to contract but may include a review of the requirements, design specifications, system architecture, project control and

support areas.

Version 1.1 is released in four months or so with the serious bugs fixed and perhaps a new feature or two added to meet "competitive pressures." In one case, a full Version 2.0 hit the market within a year of the first release!

One has to speculate that these problems are now greater in a Windows-OS/2 environment. Font drivers, nonexistent de-install support and complex .INI files make the job that much harder for the support staff.

Don't suffer in silence

What is a microcomputer manager to do in the face of this madness? My suggestion is not a new idea, but it is a rather simple one. Pick up the nearest phone and call your software publisher's local sales representative. Tell him that you are fed up with upgrade mania and want the following:

- Protection for the financial investment in your existing software licenses.
- Multiple version upgrade jumps.
- The ability to buy older versions of a product.
- Insulation from platform changes (Unix, OS/2, Windows, DOS).

In short, you want a software maintenance agreement. And while you're at it, couple the agreement with concurrent-user LAN licensing and competitive upgrades. You can save your company a ton of money.

King is assistant vice president of information systems at Continental Insurance Co. in Neptune, N.J.

software development methods and tools; participation in code walk-throughs and the development of interim and acceptance test plans; observation of interim tests; and participation in final acceptance testing.

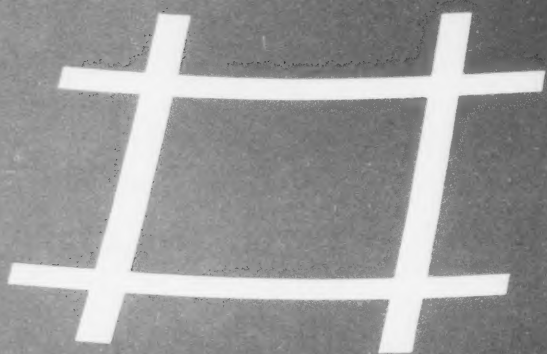
The contractor charged with independent verification and validation (IV&V) can also be asked to provide alternative courses of action if problems are discovered.

IV&V contracts typically add about 10% to the cost of a development effort; however, the payoffs have been considerable in an environment that was long plagued by cost and time overruns and failures in technical performance.

When millions of dollars are at stake, buying insurance is a prudent business move. IV&V can help catch problems before they turn into disasters and either ensure the success of the project or minimize the loss.

In this case, business executives could learn a lesson from the DOD.

Fried is vice president of information technology consulting at SRI International in Menlo Park, Calif.



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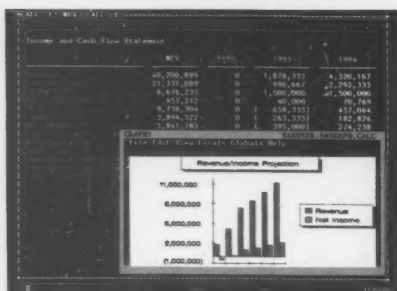
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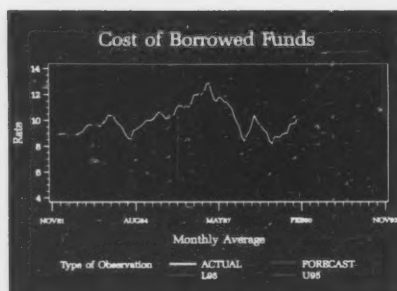
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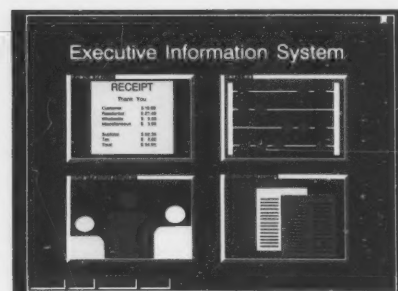
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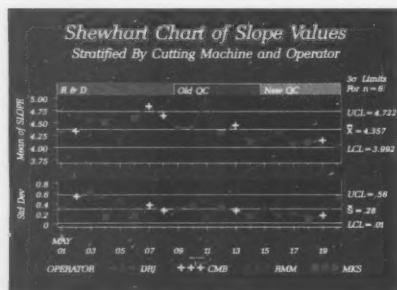
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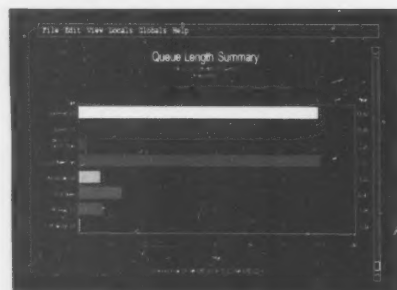
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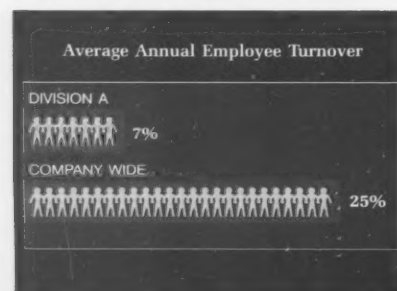
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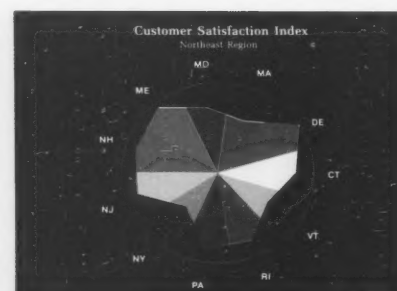


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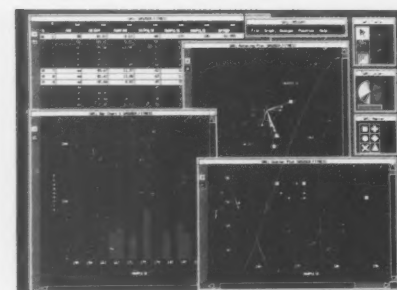
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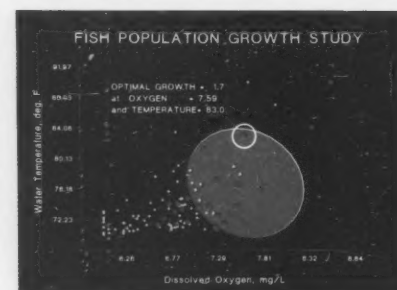
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DESKTOP COMPUTING

PCs AND SOFTWARE • WORKSTATIONS

WINDOWS VIEW

Jesse Berst

GUI costs get gooey



How much will it cost your company to make the transition to a GUI? How much will your firm benefit?

I can't tell you with precision, of course. Every company starts with unique needs and conditions. But I can share some hidden expenses other firms uncovered when they made the changeover. And I can tell you about a survey this fall that — to my knowledge — will be the first comprehensive look at real-world costs and benefits.

Most companies must buy hardware and software upgrades when they switch to a GUI. Even so, you may encounter hidden costs, such as the following:

• Memory upgrades.

"Whether it's Windows or OS/2, you have to add 2M bytes more than the manufacturer recommends," counsels Diane Taylor, manager of office consulting at Ernst & Young. Memory may be getting cheaper, but 2M bytes can run you \$80 to \$100 per PC.

• **Testing costs.** Taylor's group had to go through an extensive six-month testing cycle to make sure its new Windows platform was compatible with the company's extensive collection of software, including specialized tax programs, electronic mail and utilities.

• **Replacing utilities.** Many IS managers plan for upgrades to major applications but overlook utilities. Many DOS users have dozens of special-purpose pro-

Continued on page 40

'Toys' find their home in corporate IS

Three firms tell how today's smallest computers are enticing to users and maturing in business uses

BY MICHAEL FITZGERALD
CW STAFF

Palmtops, handhelds, personal digital assistants — call them what you will, but many information systems managers and analysts have always given them a different name: toys. Now, that is changing.

Handheld computers such as Hewlett-Packard Co./Lotus Development Corp.'s 95LX, Sharp Corp.'s Wizard and Fujitsu Personal Systems Ltd.'s Poqet still sell mainly to individuals for use as personal organizers, but some businesses have taken a serious interest in them because they are portable and cost only a few hundred dollars.

Brooklyn Union Gas

At Brooklyn Union Gas Co., for instance, about 100 Wizards are used for various purposes.

The utility company first used the Wizard in its customer service operations. The company had built a personal computer-based expert system using VP Expert from now-defunct Paperback Software, Inc. to guide customer service representatives through a maze of regulatory information when they help customers set up accounts. But there was only one PC for every five reps, and most chose not to use the computer.

"We wanted cheaper, widely usable products," said Connie Lamicela, a programmer/analyst at Brooklyn Union. The Wizard presented an inexpensive and easily available way to outfit all representatives. Now, each rep has a Wizard at his station, eliminating the need to go back to a PC and look up information.

Lamicela rewrote the VP Expert system in Basic to run on the Wizard, which is not DOS-

compatible but does read ASCII.

The Wizard "fits into vertical applications where you just don't need all that power," Lamicela said. She acknowledged that the Wizard has limited use for people who type heavily but said the expert system uses a touch screen, and the machine's low price

"Execs see it, and they pick it up because it interests them, but they won't touch their PCs in their offices. I don't think it's as threatening as a PC," he said.

Wysock said the company first bought Wizards to use as personal organizers. Merck now has between 500 and 600 Wiz-

Wysock said Merck may buy as many as 1,300 more Wizards in the next two months for the meeting synchronization and Latin American projects. It will also try several Gateway HandBooks. Wysock said the HP 95LX lacked the power and capacity financial applications would need.

Merchaid

But the HP 95LX suits Merchaid, Inc., a research firm in Portland, Ore., just fine.

"These have been a great time-saving device," said Beth Radich, a field supervisor at Merchaid. Merchaid owns some 60 95LXs and has used them to automate its retail-store data gathering, for which it previously used standard clipboards and paper forms.

Merchaid used to wait for forms to be sent back to its home office through the mail, then keypunched the data into the computer. With between 5,000 and 16,000 data points in each report, the process was long and the opportunity for error great.

Now, field researchers upload data from the 95LXs at the end of their day via the device's modem attachment, cutting at least three days from the process.

Radich said the size of the 95LX is what sold the company because the relatively bulky clipboards the researchers had to carry around became burdensome during the course of a day.

Still, while the project has gone "amazingly well," according to Radich, Merchaid has moved to the 95LX very carefully. After starting its research some 14 months ago, it began a pilot in its Seattle region six months ago and rolled the 95LXs out to the other researchers after a three-month test process.



Merck's Wysock says the Wizard's toylike appearance generates interest — and use — among those who feel threatened by a PC

makes it more attractive than notebook computers in many environments.

Merck

Merck & Co. has also embraced Sharp's Wizard for a number of users and is readying a pilot of the new HandBook, a 2½-pound small PC from Gateway 2000 Ltd. One staff computer expert in the sales group said that while the small systems look like a joke, looks are deceiving.

"They're toys when you look at them, but when you work with them, they're more," said Edward Wysock, senior applications coordinator at Merck's Human Health Division in West Point, Pa.

In fact, the toylike appearance of the Wizard has been a plus for Merck, Wysock said.

ards, which executives and sales representatives use for expense report processing and meeting planning, among other things. Merck is also working on a program for the Wizard that will help Latin American managers run their sales territories.

Despite its tiny size, the Wizard is effectively as powerful as the original IBM PC, so it can be used for more data-intensive applications than it might appear.

Merck's reps in North America use the Wizard with a program called Calandar for Windows from Microsystems Software, Inc. in Framingham, Mass. The program lets Merck executives synchronize schedules for more effective meeting planning by downloading information from their PCs or through an on-line session.

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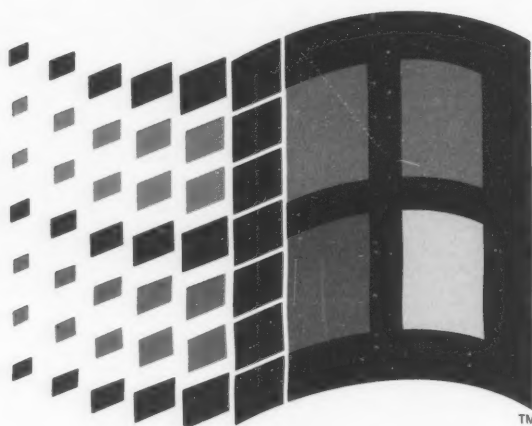
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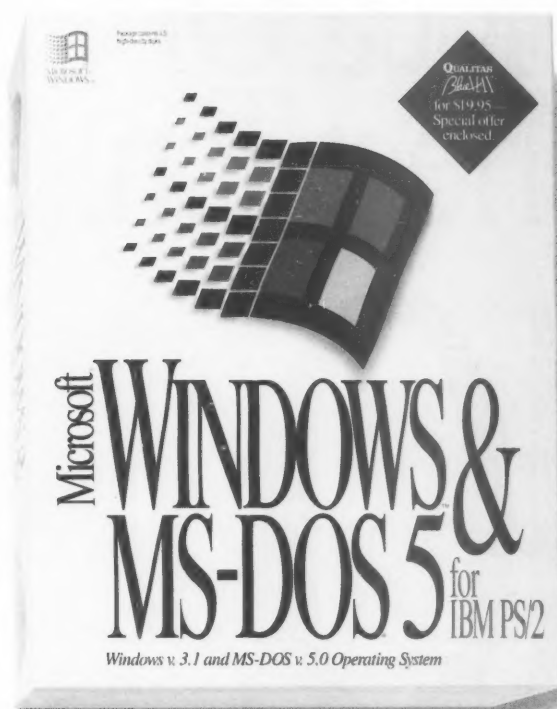
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Transportation firm chooses OS/2 for corporate standard

BY ROSEMARY HAMILTON
CW STAFF

JACKSONVILLE, Fla. — While many companies are preparing to support a mix of desktop platforms in the future, CSX Corp. is attempting to standardize on just one: IBM's OS/2 2.0.

Establishing a corporate standard may be easier for CSX than for some other companies: The bulk of users have not yet made the switch to personal computers

and are not wedded to one PC operating system. Of the 20,000 desktops at the transportation company, 14,000 are dumb terminals.

The OS/2 selection was one of the first tasks for George Sekely, who assumed the top information systems slot at CSX Technology, the company's IS group, in June.

His first choice for the engine of CSX's desktop platform was the Intel Corp. 80386 chip and its future generations. "I

didn't have much doubt that it would be the Intel chip, if for no other reason than plain economy," he said.

With that established, he added, the selection of OS/2 over Microsoft Corp.'s Windows or future operating systems was not difficult.

"The primary features of Windows, the pop-up menus, the user-friendly front end, is not really all we wanted for the industrial-strength applications," Sekely said.

He also said he does not intend to seriously evaluate Windows New Technology in the near future.

"I waited long enough for OS/2. Am I

supposed to wait another two years for NT?" Sekely asked.

To CSX, OS/2 is a robust desktop operating system, which will be important as the company moves to a more cooperative processing environment.

Sekely also said that IBM has assured him it will provide "bridges" from OS/2 to future software from Taligent Corp., the joint venture of IBM and Apple.

"IBM is mostly likely to come through with that kind of a statement," Sekely said.

He said he expects CSX's migration to take "half a decade" because he is not interested in a wide-scale implementation.



CSX's Sekely eyes IBM's OS/2

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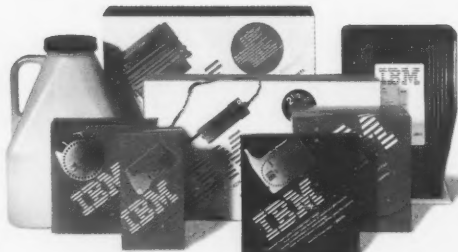
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Berst

CONTINUED FROM PAGE 37

grams. Sometimes these utilities can still be used under Windows. Often, however, they have to be scrapped, and replacements can cost \$35 to \$99 each.

• **Conversion costs.** When a Wall Street firm recently changed over to Windows, it had to hire a programmer for several days to create a custom conversion filter. It needed the specialized program to get thousands of documents from its character-based word processor into its new Windows word processor.

It has been more than two years since Windows 3.0 appeared on the scene.

However, I am unaware of any research showing the cost/benefits of moving to a GUI. A forthcoming survey by the Microcomputer Managers Association (MMA) and *Computerworld* should address that question. It will be released at the MMA's annual meeting Sept. 16 in New York. The results will be published shortly thereafter.

In the meantime, I'll leave you with an encouraging case study. You can't switch from the character-based world to a GUI without spending money. If done right, however, the changeover might actually save you money.

That's been the happy experience of Theresa Doyle, vice president of computer and information services for the equity research division at Dean Witter Reynolds. Along with four computer systems analysts, Doyle tends to the computing needs of 110 users.

Those users are in the midst of converting to Windows right now. They made the switch because they wanted the benefits of the WYSIWYG environment of Windows.

Doyle says the move "hasn't been difficult at all," thanks to lots of planning. What's more, Doyle calculates the group will save \$50,000 the first year, including onetime setup and training costs.

Doyle is in this pleasant position because the switch to Windows lets her eliminate expensive terminal rentals. Her group is now able to receive real-time market data through a Windows program. In addition, Doyle didn't have major capital expenditures to contend with. Since she leases all her equipment, she's simply been moving from 386s to 486s as the leases expire.

Berst is the publisher of Redmond, Wash.-based "Windows Watcher" newsletter, a monthly briefing service for software executives and corporate technology managers.



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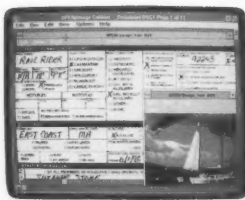
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WANG OFFICES THAT WORK

White Paper

Introduction

Image processing is a critical technology for many companies seeking a competitive edge, and enterprise-wide imaging is already playing a crucial role in some of the world's most successful companies. Despite its advantages, however, imaging has still not established a widespread presence in the U.S. business community. Even though it has gained more acceptance in foreign countries, it still has not fulfilled the hyperbolic claims made in its behalf.

Anemic economic conditions have certainly played a significant role in suppressing the growth of imaging. Although its potential is alluring, its price tag may be daunting. No promise of profits down the road can put nonexistent funds into capital budgets, and the future is now for businesses with their eyes locked on the bottom line.

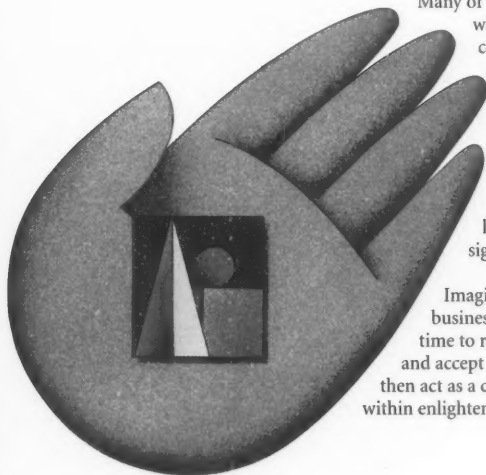
Information Systems (IS) departments are among those hardest hit by the economic downturn. Frequently denied even the opportunity to have input on hardware and software buying decisions, they are unable to demonstrate the value they can add with imaging if given the chance. As a result, imaging and other new technologies such as reengineering, workflow software and groupware can languish unused.

Many of the negative aspects associated with imaging have been overcome. Networks and image compression schemes are now largely standardized. Further, the price per seat has dropped from \$100,000-plus in 1985 to \$20,000 in 1992. And the cost per transaction — a truer indication of cost — has dropped even more significantly.

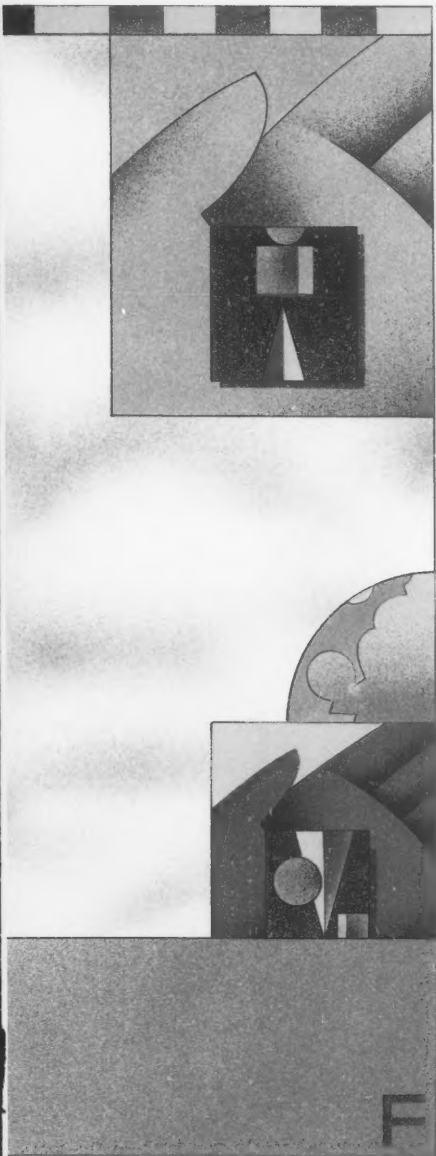
Imaging will flourish when the business community realizes that it is time to reexamine its outdated mores and accept internal change. Imaging can then act as a complimentary technology within enlightened organizations.

This White Paper was written independently of the Computerworld editorial department by Scott McCready, Director, Image Systems with IDC.

For more information on the White Paper Program, please call 508-879-0700.







IS professionals at home and abroad are under siege. Budgets in many cases are flat if not declining, and the IS influence over IS-related expenditures has been showing a marked decline in recent years. Many companies are throwing around terms such as outsourcing, downsizing and reengineering, in many cases with little thought. Given these difficult times, it is not surprising that many IS professionals simply do not have the time or energy to cope with new technologies such as imaging, workflow software, groupware, et al.

"It's difficult to take a long-term strategic perspective on technology when the alligators are already in your swimming pool," is the way one IS manager describes his inability to plan for imaging. He is not alone. A worldwide study of 5,000 IS professionals conducted by IDC's Worldwide IT Customer Directions and Strategies Group shows that only 14.2% of IS professionals in the U.S. and 12.6% worldwide intend to implement any significant type of imaging capability in 1992.

Despite this modest forecast, cost-conscious user-company top management must understand that imaging, when combined with a more enlightened approach to business practices in

ENTERPRISE- WIDE IMAGING

general, can lift companies into a stronger competitive position. Effecting this kind of fundamental change in the traditional business psyche is difficult at best.

There are several arguments IS professionals give for not implementing imaging:

- Unless imaging can be implemented on an enterprise-wide basis it is difficult to justify the investment from a financial or architectural perspective
- Until imaging is available from system vendors, IS professionals cannot afford to invest significant resources
- On a cost-per-seat basis, imaging is simply too expensive
- Until there is a broad-based set of standards, imaging is too expensive to acquire, maintain and support
- Imaging is only good for specific departments and the onus is on them to interface with IS
- Imaging is flashy while microform technology is cheaper and legally acceptable.

Now that imaging is commonly based on standard networks, uses PCs without any specialized hardware boards, and is available from IBM, DEC, NCR and other leading vendors, the IS justification for not employing imaging on a broad-scale is eroding. Cost/seat prices have fallen from \$100,000/seat in 1985 to generally less than \$20,000/seat in 1992. Cost per transaction (a truer measure of cost) has fallen even more significantly over time.

The lack of specific ISO and de facto imaging standards is no longer a solid reason for not implementing image systems. There are CCITT Group 3 and 4 standards for compressing images, and many of the de facto standards used in the IS world — SNA, DECnet, etc. — are equally applicable to imaging.

IDC/Avante also believes the issue of imaging versus microform is moot. Microform is a valid tech-

nology for the long-term storage and retrieval of documents, and as such will be useful into the 21st century. Imaging is a less expensive way to process documents when they are in their active life cycle. Therefore, imaging and microform technology should be able to co-exist as part of a migration pattern in which active documents processed by imaging gradually become less active, or age to the point where it makes sense to store them on microform.

This is not to say that imaging is not effective in a file and retrieval mode, but retrieval rates have to be relatively high to justify the additional costs associated with imaging technology.

The primary remaining impediment to not implementing imaging concerns its applicability to a limited set of line-of-business activities. This is not a weakness but indeed a strength.

Imaging tends to yield the highest paybacks in industry-specific line-of-business activities. For example, insurance companies obtain optimal results by automating underwriting or claims processing functions. Banks typically benefit most from employing imaging in a mortgage loan servicing or credit card correspondence environment.

The challenge for IS is to find out which business problems respond best to imaging, and then implement imaging before the particular line of business installs its own maverick imaging system. In such a dynamic environment, the enterprise-wide IS architecture may be put at some risk. It is thus incumbent

upon IS departments to become knowledgeable about their companies' business operations at increasingly lower organizational levels.

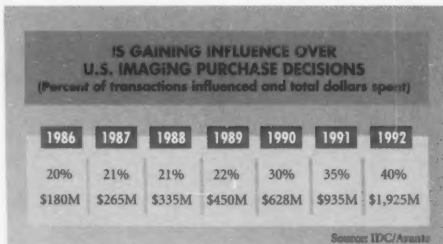
Imaging and associated technologies such as workflow software and groupware can propel IS into a position of prominence.

THE ERODING IS POSITION

The trends of downsizing and outsourcing could not have happened at a worse possible time for IS professionals. Not only are they losing resources, but many IS shops are maintaining business applications that are 20 years old or older, and doing so without the promise of increased funds for support and maintenance. The problem is exacerbated because PCs and LAN purchases are eating into IS budgets dramatically. As the keeper of the enterprise-wide architecture, IS has been required to support an ever-divergent group of users requiring PC and LAN support, and demanding expensive departmental systems such as imaging.

Further, with desktop computers becoming as powerful as mainframes were 10 years ago, it is increasingly difficult to argue for a host-centric, central-control approach to automation. Client/server architectures are marching forth and the commodity pricing of computer power at the desktop and server levels shows no evidence of slowing. Therefore, the role of centralized IS departments will decrease as more and more companies refuse to write new mainframe applications, and more technologies such as imaging and OCR are put on networks. Add to this the pressure for open and standard systems, and it is easy to understand why IS is under siege.

On the bright side, the combination of PCs, LANs and existing network backbones creates the infrastructure IS requires to take its rightfully prominent place in corporate and organizational structures.



Although IS is increasingly gaining power in imaging system purchases, it is still left out of 60% of these critical transactions.

Enterprise-wide Imaging

TROUBLE IN THE BUSINESS WORLD

How many people have not heard the term reengineering? Not many. But how many really understand what it entails? The common perception of reengineering is that of gut-wrenching change in business systems and a whole new set of business applications that must be written or rewritten. The fact that business systems were not engineered in the first place hardly seems to matter to senior management hell-bent on reengineering their businesses. What does matter is that more and more businesses are recognizing the need to change.

There are several business factors that suggest that all is not well in the business world:

- The quest for Total Quality Management (TQM) is rapidly becoming a national obsession
- There is an increasing focus on the top-line (market share, revenue growth) as opposed to the bottom line (profit)
- Commodity pricing for PCs, LANs and servers means that the system vendors cannot afford to do business as usual. The major vendors face many of the same issues confronting IS
- Only through a continuous improvement program (CIP) can companies raise customer service levels and product quality while reducing costs and empowering employees.

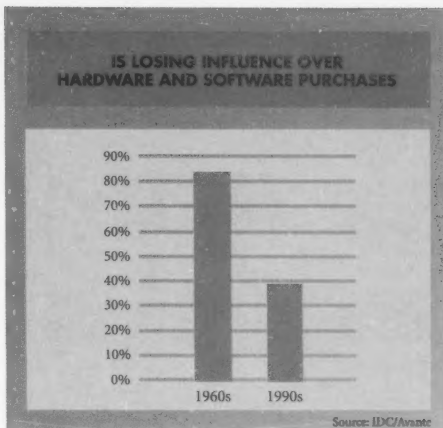
IS ENTERPRISE-WIDE IMAGING REALISTIC?

Given the transformations taking place in the IS function, is it reasonable to expect IS to envision and implement an enterprise-wide imaging environment? Perhaps more to the point, does it make good business sense? There is a three-part answer to these questions. An economic response, an organizational or

logistical response, and a technical response.

Economically, it may make sense for some companies to employ imaging from an enterprise-wide perspective. The economic argument in some cases may be based on the ability to provide a new product or service that would not be possible without the use of image technology. However, for most companies the capital outlay for an enterprise-wide system must be spread over several years. Since most users must cost-justify the acquisition of image technology, this commonly limits imaging as an all-pervasive data type. Consequently, image technology has been limited to those areas where well-documented financial return was possible. Despite this trend, the shift from imaging in line-of-business applications to enterprise-wide use is slowly taking place.

Part of the reason for starting small may be attributed to simple economics, but certainly the limitations of the technology — most notably, its limitation to a single database domain — and the complexities of completing the necessary up-front analysis have also contributed significantly to the departmen-



Even though IS is slowly exerting more influence on imaging system purchases, it is losing its overall clout on major technology acquisitions.

tal adoption approach of image users.

Organizationally, the hurdles of employing imaging technology on an enterprise-wide basis are formidable. In these lean fiscal times, the frequent senior management philosophy is, "If you are going to fail, make sure you fail small." That is why the first imaging project is often in the area of a company where failure has no price and success has little or no impact. These initial imaging projects are also frequently not transferrable to other areas of the enterprise.

The organizational issues, more than the economic or technical considerations, pose the biggest obstacles to enterprise-wide imaging.

Technically, enterprise-wide imaging is possible. The challenge for vendors and users goes beyond connecting disparate computer architectures, or employing standard and open systems. The challenge is separating those vendors with connectivity from those vendors that can layer an appropriate product set on top of the existing information processing infrastructure.

Most imaging users are automating the paper process. Since paper transactions cross not only LANs and wide-area networks (WANs) and in many cases countries, users need an architecture that not only allows transactions to flow freely but also can track and control transactions. This is where most enterprise-wide efforts begin to fall apart.

The other problem is that image systems tend to be bought and implemented in a helter-skelter fashion by various lines of business. Without some degree of IS coordination, many companies will rapidly acquire imaging systems from several vendors, thereby complicating the drive towards an enterprise-wide capability.

Enterprise-wide imaging involves

more than simply integrating disparate computer architectures. It also requires access and customized views of the associated data and images. The definition of enterprise-wide access is not complex. Once a specific business function is automated with imaging technology, people beyond the newly automated department can also benefit from the imaging database. Therefore, it is necessary to find an economical method that provides casual access to this new database resource. This casual access should involve a consistent front-end that shields the user from the native interfaces.

Providing an enterprise-wide imaging system requires the use of sophisticated folder software, which allows users to view data and associated images for multiple management functions without storing the data and images multiple times.

Most of the system vendors, such as IBM and Digital Equipment, offer imaging based on their existing strategic architectures. For database management systems, this means Rdb and DB2. Networking is based on DECnet and SNA. The imaging system vendors are also catering to standards by supporting common databases, such as those available from Oracle and Sybase. 3COM and

Novell are the most prominent network operating system companies. Interactive multiwindow desktop interoperability is commonly offered through Dynamic Data Exchange (DDE) under MS Windows 3.0.

Currently, no single vendor offers true one-stop shopping. The system vendors are trying to address standards. When it comes to workflow software, they fail to

understand it from an application and system-resource perspective. The image vendors are closing in on workflow soft-

ware application solutions, but they are not large enough to convince many large corporations to view them as significant automation suppliers.

THREE ORGANIZATIONAL MODELS

Enterprise-wide imaging systems generally reflect one of three organizational models. The first model is the traditional view. This model has a large number of workstations, is normally constructed with conscious architectural considerations, and is usually compliant with evolving standards such as those proposed by the ISO's Open Systems Interconnect model.

The second model of enterprise-wide architectures reflects the software changes IDC/Avante believes must happen if users are to widely implement imaging. These changes imply the use of folder software to present individual views of the data and images while only storing and manipulating one set.

The third model is based on the premise that the concept of the enterprise is expanding to include not only the user company, but its suppliers, agents, customers and government. All of these groups may be found in a single image implementation.

Today, many vendors and users alike

are stuck with the traditional model of enterprise-wide imaging. However, IDC/Avante sees a definite trend towards the second model, particularly in the insurance and healthcare industries. The third model is more applicable to truly innovative companies, mostly found in the financial sector.

VENDOR APPROACHES

Sigma Imaging Systems is one vendor that preaches the gospel of distributed processing and central records control. It strives to leverage its systems at all levels while offering the ability to expand systems incrementally without having to add gigabytes of storage or make other dramatic changes. Sigma has implemented a system at Empire Blue Cross/Blue Shield with these central concepts in mind. The system features 23 Kodak ImageLink 9000 scanners, processes 100,000 documents/day, includes six jukeboxes at three sites: Albany, N.Y., New York City and Yorktown, N.Y.

The system automates multiple lines of business: medicare, a dedicated state service center and claims processing. The single catalog of images and the various jukeboxes communicate over an SNA network that links all sites. Work-

SAMPLING OF ENTERPRISE-WIDE IMAGING SYSTEMS IN THE U.S.

Vendor	Workstations	Customer	Application
Sigma Imaging Systems	1,650	Empire BC/BS	Multiple
FileNet	175	Chemical Bank	Multiple
FileNet	200+	Phillips Petro	Accounting
IBM	<50	D. B. Kelly	Photo Inspection Records
IBM	1,500+	USAA	Claims Processing
IBM	1,000+	WCB of Ontario	Claims

There is still a limited number of enterprise-wide imaging systems.

"Without some degree of IS coordination, many companies will rapidly acquire imaging systems from several vendors, thereby complicating the drive towards an enterprise-wide capability."



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1993—and already they're ahead of schedule.

They later added, "ImagePlus let us respond to our day-to-day customers—immediately."

• In finance, take the example of Massachusetts Financial Services, which supervises \$28 billion in assets for over one million investors.

In less than two years they slashed workflow steps 55% by gradually changing from their wasteful paper chase, to ImagePlus. As for productivity, it jumped 20%.

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And that, together with our specialized consultants and network of Business Partners, we can tailor the best hardware, software and consulting services to fit your exact needs.

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The IS Call to Arms — 11 Steps to Change

Unless there is a general call to arms, IS will become a simple maintenance function with some network caretaker services provided by specialists. It will have no opportunity to add value or make critical decisions. The call to arms should include several elements. In order to fulfill them, IS professionals must:



1. Understand the business environments of their companies and determine the appropriate mix of technologies to accommodate those environments.

2. Fully leverage existing IS infrastructures.

3. Recognize that IBM and Digital will be the network providers of choice, while imaging, workflow software and groupware will more than likely come from companies such as Lotus, Plexus, FileNet, Action Technologies, Wang and Computron.

4. Recognize that outmoded development environments must go. Hard coding imaging solutions simply recreate nightmarish support and maintenance scenarios. Instead, users should use automation efforts to ensure that the workflow process is isolated from the business application, and eventually from the data application. The goal is to change the workflow without negatively impacting other processes.

5. Beware of vendors offering a new lease on life through image-enabling legacy applications. This may be a suitable migration strategy for some, but it may leave others in a technology purgatory between the old and new worlds.

6. Break down the communication gap between IS professionals and business people.

7. Be aggressive with major computer suppliers. IS must demand that the system vendors alone, or in partnership, provide the appropriate products and services needed to get IS out of their legacy environments.

8. Implement imaging with an enterprise-wide view in mind while being mindful of the changes enterprises are experiencing.

9. Understand that imaging and the issues associated with imaging are typical of the organizational and technological issues that IS will be confronted with in the next ten years.

10. Shift IS expenditures away from processing transactions and toward automating people and the relationships between them.

11. Recognize that we are in a unique point in automation history. The competitive battleground is not simply quality or the time required to get to market. Instead, the competitive battleground is based on creating value, which, in the words of Russell Redenbaugh, Chairman of Action Technologies, is "the new coin of the realm." As such, we are not so much automating the flow of paper or data. What we are really talking about is an overall automation environment that allows systems to allocate resources dynamically.

in-progress is distributed on OS/2-based systems, but the image catalog — which contains 22 million documents — is on an IBM ES/9000.

FileNet Corp. considers its implementation at Chemical Bank in New York City to be an enterprise-wide system. According to FileNet, the system currently includes two cities, five systems and nine applications. Its users share data and images in a variety of different ways. Application processing, charge-backs and customer service applications reside in one city while the users are in two cities. FileNet says the

system qualifies as an enterprise-wide system based upon its having data available to a distributed set of people or multiple applications that may be colocated or distributed.

Wang Laboratories believes there are few, if any, image systems that are truly enterprise-wide. In fact, Wang argues there may not even be a demand for enterprise-wide systems in which anyone working in an organization has access to all information. With the exception of small and focused enterprises such as resume access in a recruitment environment, Wang believes the need for every-

one to have access to all data is simply not required. Since there is a division of labor between departments, the company maintains that it is unlikely that one form of information has to be accessed by all groups.

Despite this position, however, Wang also believes it is very important for prospective imaging customers to consider the enterprise-wide imaging implications in their up-front analyses because it leads them into considering the possible impact of standards and the implications they may hold for future expanded imaging systems.



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Imaging by all means



Not surprisingly, IBM has done a lot of thinking about the issue of enterprise-wide systems. The company says enterprise-wide imaging has a lot more to do with the approach than with scale or scope of implementation. It cites a number of notable considerations, including the need for:

- Some element of work management
- An industrial-strength solution
- A conscious set of architectural elements.

THREE ENTERPRISE-WIDE SCENARIOS

IDC believes there are three possible scenarios for enterprise-wide imaging systems. While all three are different in definition they are certainly not mutually exclusive.

The first scenario includes hundreds of workstations as are found in implementations at USAA of Plano, Texas, and Putnam Investor Services of Quincy, Mass. These systems are absolute in scale, meaning the number of workstations they support can be expanded without limitation.

The second scenario is found in

small companies where imaging is pervasive across the entire business. D.B. Kelly, which uses imaging to eliminate insurance fraud in the automobile inspection process, is an excellent example of this approach, which typically calls for fewer than 50 workstations. However, the ratio of workstations to employees is nearly one-to-one. D.B. Kelly is all the more remarkable because imaging allowed it to create a business that was not feasible without imaging.

A third scenario of enterprise-wide imaging comes into play when companies redefine their definition of the enterprise. IBM implemented an internal imaging system to handle customs documentation (IBM was the first company allowed by U.S. customs to destroy the original paper documents). Subsequently, the system is being expanded to include the customs brokers that handle IBM shipments at the different ports of entry.

GLOBAL IMAGING IMPLICATIONS

IS managers in the U.S. are not alone in the struggle to place imaging, work-

flow software and groupware in perspective. As Europe marches toward a monetary union, many United Kingdom and European IS managers are also coming under intense pressure to provide a more seamless IS environment on an intercountry as well as an intracountry basis.

Despite the European unification efforts, however, it is a great mistake to perceive Europe as one market. The use and sophistication of imaging in various European countries is as varied as the business problems imaging solves in the U.S. For instance, Spain and Italy frequently implement file and retrieval applications, while Germany uses more workflow technology.

Far from being one market, Europe will remain a series of relatively unique markets well into the next century. Certainly the European Community (EC) simplifies many of the legal issues that U.S. companies must comply with in order to do business in Europe, but the driving factors behind the acquisition of new technology will still be different in each country.

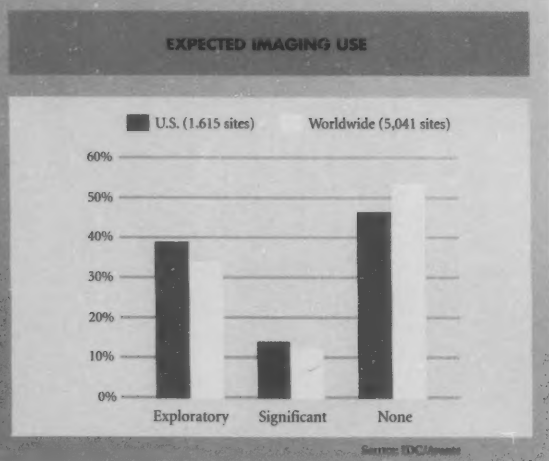
As one European explained it, "We are all part of the EC but that does not mean we are similar or that we necessarily even like each other."

APPLICATION BRIEF

The State of Missouri, Employment Securities

This agency's job is to collect quarterly employment taxes. This means that once a quarter Employment Securities is literally deluged with thousands of checks. The result is that its processing cycle has huge peaks that last for 10 days.

Before implementing imaging, it took 10 days to pull the checks and get them to the bank. Anyone that was available from another department was requisitioned to pull checks because the state wanted to reduce float and make sure it could tell people that their payments had been received. It took approximately six weeks to get the information off the reports and get the basic



Users are cautiously committing themselves to imaging systems.

Enterprise-wide Imaging

data into the agency's system. It then took another week to place the reports in numerical order. Eventually the reports were microfilmed, which took two more weeks.

The state's customer service representatives charged with replying to taxpayer inquiries did not have the necessary information until the end of the next quarter. Now, as soon as the check is pulled, the accompanying documents can be scanned and indexed. As a result, customer service has the information it needs within 48 hours of the check being pulled, and nine-to-ten weeks of waiting time is eliminated.

APPLICATION BRIEF

State Retirement Fund, Illinois

The State Retirement Fund was being forced out of its location, which was a problem because it had several million paper documents stored in cardboard boxes and on shelves. The fund had a finite number of dollars to spend, and had to decide whether to build special storage space into its next building or change its paper process. It opted for the latter, acquiring an image system in advance of the move to the new building. It used the system solely for converting paper to images. As a result, on moving day, everything moved but the paper records.

JAPANESE IMAGING MARKET SHARE BY INDUSTRY \$M (Percent of dollars spent)				
Industry	1992	1993	1994	1995
Banking	14%	17%	18%	20%
Insurance	7%	9%	11%	12%
Financial Services	6%	8%	9%	10%
Manufacturing	24%	25%	24%	24%
Transportation	5%	5%	6%	6%
Utilities	3%	3%	4%	4%
Government	21%	21%	20%	18%
Other	20%	12%	8%	6%

Leading Japanese imaging users in the manufacturing and government sectors frequently rely on electronic filing cabinet applications.

APPLICATION BRIEF

State of Louisiana, Department of Public Safety

The State of Louisiana Department of Public Safety needed to supply information on drivers to many other agencies and departments. Problem drivers are a large part of that information, and tend to remain that way over time as they go in and out of the court system, amass police driving records and have their licenses revoked. Insurance company requests further compounded the state's information retrieval demands. In this environment, the state typically provides information to six outside organizations. Since placing this information on an imaging system, all files are readily available, and can be easily shipped across communication lines. The state's goal is to leverage imaging to the point where it no longer needs paper and microfilm, but can maintain information in an electronic folder. It also wants to include arrest histories — which are

maintained separately from driving records — and mug shots in these electronic folders.

The state eventually wants this information to be accessible not only by the Department of Public Safety but by the court system and mobile units of the fire and police departments. The agency receives 12,000 pieces of documentation weekly, and has a 12-million-document backlog. So far, 2,000 termi-

nals have been installed to fight the imaging battle.

APPLICATION BRIEF

American Republic Insurance Company

American Republic has \$386 million in assets, \$150 million in health premium income, \$1.4 billion in current life insurance business and 200,000 policy holders. It installed an imaging system in order to bring a higher level of automation to its claims adjustment department in the health claims area. Currently this area handles 1,300 claims per day, which is a 25% increase in volume over last year.

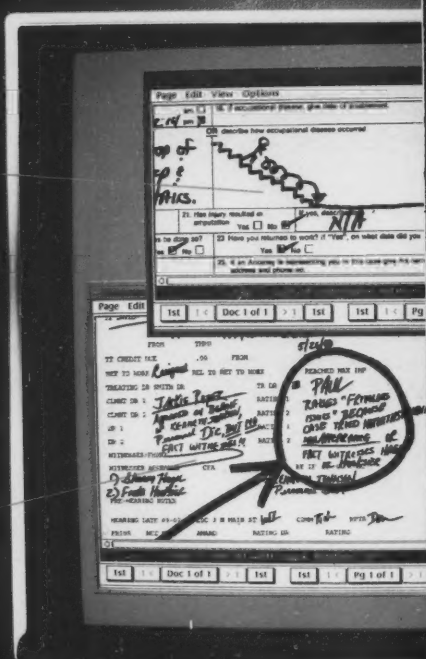
American Republic estimates that its image system will save \$1.25 million over the next five years on reduced staffing costs. An additional \$48,000 is expected to be saved in microfilm equipment and services.

SOME CHICKEN SCRATCH A DOODLE FROM PERSONNEL THE IMAGING

Different kinds of data in different formats all over your organization. From computer files to tattered manila folders. What happens when you need to access that information ^{to find report back inside attorney's briefcase} in order to settle a worker's claim, for example? Or if more than one person needs to review the same file at the same time?

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1/10

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Signature: [illegible]

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Sincerely, [illegible]

Lance A. May

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Harvest month reaps crop of 21 viruses

BY JAMES DALY
CW STAFF

The summer may be waning, but things on the virus front continue to be hot. Besides the usual rogues gallery, a couple of new faces have appeared, including one that takes its inspiration from J. R. R. Tolkien's *Lord of the Rings* fantasy trilogy.

The 4096, or Frodo, virus is

destructive to both data files and executable files as it very slowly cross-links files on the system's disk, according to officials at Fifth Generation Systems, Inc., a Baton Rouge, La.-based developer of data security software. The cross-linking generated by the nearly invisible virus occurs so slowly that it appears there is a hardware problem.

The virus derives its name from two sources. First, the length of the infected file is increased by 4,096 bytes, although the increased length will not show up when a DOS DIR or CHKDSK command is executed.

In some cases, the virus will also display the message "Frodo Lives" on or after Sept. 22, that date being the birthday of Frodo and Bilbo Baggins, two fictional characters in Tolkien's series.

Another September virus is AirCop B, a memory-resident nuisance strain that infects only floppy disk boot sectors. Booting from an infected disk results in the message, "This is AirCop."

Also new on the agenda is the relatively rare Plastique (also known as Plastic Bomb, Plastique 3012 and AntiCAD3). Once loaded into memory through an infected .COM or .EXE file, it infects all executed .COM and .EXE files except COMMAND.COM.

The virus becomes active after Sept. 20. It may either progressively slow a system down — with some strains halting the system after 30 minutes — or intermittently emit a bomb noise from the speaker.

The ubiquitous Cascade virus causes individual letters to appear to fall, or cascade, from their position on the screen to the bottom. It infects only .COM files on personal computer systems with IBM Color Graphics

Adapter or Video Graphics Array-based monitors.

These dates are not guaranteed. They are presented here more for general awareness.

Experts advise scanning any

THE 4096, or Frodo, virus is destructive to data and executable files as it very slowly cross-links files on the system's disk. It gives the appearance of a hardware problem.

drives on its trigger date.

• **Form** — Resides on boot sector of floppies or the partition table of hard disks. It seems to do no intentional damage.

Making September reappearances are the following:

• **Day 10** — .COM file growth, file date and time change and hard disk corruption.

• **Monxla** — Infected .COM programs increase in length by 535 bytes.

• **Skism** — May affect computer performance or functions and corrupt programs.

• **Pay Day** — Systems may slow down. Files may be deleted on any Friday except Friday the 13th.

• **Frog's Alley** — Host files are COMMAND.COM and .COM files. Corrupts programs.

• **Taiwan** — On the 8th day of any month will perform an absolute disk write for 160 sectors, destroying what it overwrites.

• **Alabama** — Affects runtime operation, corrupts program or overlay files and file linkage.

• **Frere Jacques** — Available memory may decrease. Systems may crash.

• **Crew 2480** — Changes the file date and hangs up the system, which then reboots.

• **Mendoza** — Deletes the infected file and all files in the directory with the infected file. Can crop up at any time during the last half of the year.

• **AH!** — May cause crashes and a decrease in available memory.

• **Bad Guy2, Exterminator, Demon** — Overwrite the beginning of infected programs with viral code.

new disk before it is used as well as following the three basic rules of virus protection: backup, backup, backup. Among the vendors offering scanning applications are Symantec Corp., Central Point Software, Inc., McAfee Associates and Fifth Generation Systems.

New kids on the block

New nasties set to go off this month include the following:

• **Flip** — Modifies .COM, .EXE and overlay files, as well as the boot sector and partition tables. When activated, the virus flips the screen 90 degrees. May damage file allocation tables and corrupt some data files.

• **Violater B1** — Infects all .COM files when an infected .COM file is executed. It can damage data on a system by reformatting Track 0 on all system

drives. Companies may lose their best employees. The study found that job satisfaction greatly affected company loyalty and was the most important factor in an employee's decision to leave.

"In some instances we're talking about losing the best and the brightest because we don't know how to lighten the stress load," Igbaria said.

something like applications development," Igbaria said.

The survey also showed that employees who had more education and had been at companies longer were generally more able to handle stress than younger counterparts with less education and work experience.

Ultimately, the study reveals the dark side of stressful envi-

Change of season

Coming into autumn, watch out for a few viruses that didn't appear in August, in addition to the monthly regulars

September

Each month: **Crew 2480, Mendoza, Cascade, Aircop B**

Each Monday: **Bad Guy 2, Exterminator**

Each Tuesday: **Demon, AH!**

Each Friday: **Alabama, Frere Jacques, Pay Day.**

Skism will hit the last two Fridays of the month.

Every 10 days (Sept. 10, 20, 30): **Day 10**

Sept. 2: **Flip**

Sept. 4: **Violater B1**

Sept. 5: **Frog's Alley**

Sept. 8: **Taiwan**

Sept. 13: **Monxla**

Sept. 18: **Form 18, Skism**

Sept. 20-30: **Plastique**

Sept. 22-30: **4096**

Sept. 24: **Form**

Sept. 25: **Skism**

Source: Fifth Generation Systems, Inc.

The best and brightest: Prone to high stress

BY JAMES DALY
CW STAFF

Feeling tense and nervous? Can't relax? If you are a microcomputer support professional, you are not alone.

A recent study by a pair of university professors has found that high stress and gnawing job dissatisfaction are as common as ringing phones and befuddled users in the offices of many support staffs. The chief cause: ambiguous job expectations and confusion over roles, which especially eats at employees who are young, inexperienced and highly educated.

"Managers are unclear about what they expect of support, or if they tell [support people] what to do, they don't ever tell them how

to do it," said Magid Igbaria, a Drexel University professor of management who conducted the study with Tor Guimaraes, a professor of information systems management at Tennessee Technological University.

Although many jobs have ambiguous directives and arduous schedules, Igbaria noted that the incredibly rapid pace of technological change at the microcomputer level — and the demands in keeping up with those changes to remain at the top of your game — exacerbate the typical job burden and make support positions especially stressful.

That lack of direction may create support professionals who seem unresponsive to user needs. Unlike those who work

with the big iron in IS or mainframe applications, microcomputer support staffers have a continual need to train and explain and hence must communicate well.

"They must have a blend of business skills and communications skills," Igbaria said. "We sometimes found that the best support people — the least stressed — were those that had some training in humanities."

Igbaria and Guimaraes analyzed a survey of 76 support personnel employed in the banking, manufacturing and utility industries in the Cleveland area. Igbaria acknowledges that the sampling has some limitations and that additional research needs to draw on a wider sample of employees.

Survey respondents averaged 32 years of age; more than two-thirds had college degrees. Unlike IS professionals at the highest levels, about half of the support professionals surveyed were women. That made sense to Igbaria.

"The women we spoke to said they felt much more comfortable dealing with people in a support role than hunkering down in



Stressed out

Some reasons for and solutions to stress on the job for PC support workers

Problems

- Job responsibilities not clearly defined.
- Overlapping job responsibilities.
- Not keeping up to date with technological change.
- Lack of adequate training.
- No clear advancement path.

Solutions

- Encourage orientation sessions for new employees. Tell them as specifically as possible what is expected of them.
- Relate clear instructions.
- Explain reasons for tasks.
- Ensure that tasks don't conflict with another employee's duties.
- Define roles clearly.
- Monitor employees on an ongoing basis and attempt to better understand the factors contributing to a positive or negative work environment.

CW Chart: Michael Siegrist

NEW PRODUCTS

Software application packages

Mountain Network Solutions, Inc. has announced the FileSafe Plus Librarian.

FileSafe Plus Librarian was designed to enhance the company's FileSafe tape backup software. Dormant files can be groomed from Novell, Inc. NetWare servers, and files can be groomed from a DOS hard disk.

Microsoft Corp. Windows and DOS interfaces are offered, and the product is compatible with all versions of Mountain tape drives, according to the company. Features include pop-up dialog boxes,

drop-down menus and mouse support.

Prices range from \$99 to \$129.

Mountain Network Solutions
240 E. Hacienda Ave.
Campbell, Calif. 95008
(408) 379-4300

National A. I. Lab, Inc. has introduced You/2, a personal computer-based decision support software program.

You/2 combines knowledge base, decision-making process, learning curve and organizational needs into a format that can be managed and transferred. The product was designed for applications such as technical support, equipment diagnostics and human resource manage-

ment. Mouse and touch-screen support is provided. You/2 can be customized based on user needs.

You/2 runs on all IBM PC compatibles and is suitable for most networks and multi-user installations, the company reported.

The developer's version of You/2 costs \$795; the runtime version costs \$495.

National A. I. Lab
2161 Newmarket Pkwy.
Marietta, Ga. 30067
(404) 988-0909

Precision Visuals, Inc. has announced Version 2.0 of PV-Wave Point and Click visual data analysis software.

According to the company, the most significant new feature is a set of interac-

tive tools called the Database Visualizer. Users can subset and display tabular data either visually or with an icon interface to SQL commands. The Database Visualizer has a probing analyst capability that searches for hidden trends by exploring large or complex data sets.

Other features include date/time data management and display, Encapsulated PostScript Interchange output, a data import previewer and support for Silicon Graphics, Inc.'s series of four-dimensional workstations.

The product costs \$2,495.

Precision Visuals
6230 Lookout Road
Boulder, Colo. 80301
(303) 530-9000

Autodesk Retail Products has introduced Office Layout, a personal computer software package.

The product was designed to help users simplify space planning and inventory management. Office Layout includes an on-line Help utility, self-guiding menus and a 25-step undo/redo feature for experimenting with the plans or correcting mistakes, the company reported.

More than 200 predrawn symbols are included in the program, and users can create custom symbols for future use.

Office Layout costs \$149.95.

Autodesk Retail Products
11911 N. Creek Pkwy. S.
Bothell, Wash. 98011
(206) 487-2233

Macintosh products

Radius, Inc. has announced SCSI-2-Booster, a daughtercard for the Radius Rocket series of Apple Computer, Inc. Macintosh system accelerators.

According to the company, the product was designed to increase throughput to high-performance Small Computer Systems Interface (SCSI)-2 based peripherals. Data transfer rates of up to 7M byte/sec., with sustained data transfer rates of up to 4.5M bytes, can be achieved using the most current SCSI-2 specifications and a high-speed, 40-MHz SCSI-2 controller chip.

The product does not require a Nubus slot, and it features compatibility with Rocket-equipped Macintosh II and Quadra computers.

The SCSI-2 Booster costs \$299.

Radius
1710 Fortune Drive
San Jose, Calif. 95131
(408) 434-1010

WordPerfect Corp. has started shipping LetterPerfect 2.1 for the Apple Computer, Inc. Macintosh.

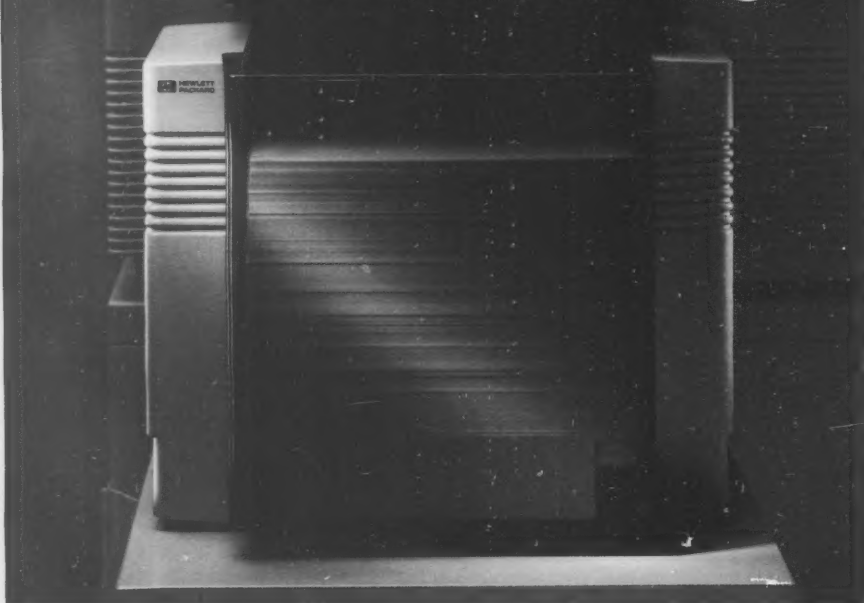
An intuitive ruler allows users to change justification and set margin tabs and paragraph indents. Ruler settings can be copied to the clipboard and applied to other paragraphs. Users can design columns with irregular widths directly from the ruler.

Graphics features permit images to be sized, moved or cropped from the editing screen with the text automatically reformatting around them. Users can create template documents including memos, letterhead and envelopes with a stationery feature.

LetterPerfect 2.1 costs \$149.

WordPerfect
1555 N. Technology Way
Orem, Utah 84057
(801) 225-5000

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Reports of low-end LAN death greatly exaggerated

BY MICHELE DOSTERT
CW STAFF

Peer-to-peer, DOS-based personal computer LANs are one of those technologies that just refuses to die.

Most analysts expected peer-to-peer local-area network operating systems to obligingly fade away when powerful client/server operating systems such as Novell, Inc.'s NetWare and Microsoft Corp.'s LAN Manager came on the scene. But although new peer-to-peer installations may be declining, a fairly healthy market for these simple, low-end LAN products still exists.

Peer-to-peer LANs provide basic network services such as file- and print-sharing but do not

support more complex file server functions.

"There are a lot of people who don't want to be bothered with setting up a server," said Bob Gill, who tracks LANs at market research firm Gartner Group, Inc. "There are still many offices that don't even have PCs, much less network engineers to link them up. Client/server LAN operating systems are pretty daunting to these people; peer-to-peer LANs are simple."

One indication of the strength of the low-end market: Novell, which already claims more than 60% of all client/server installations, launched a peer-to-peer product, called NetWare Lite, in 1991. "NetWare Lite was a stra-

tegic product for Novell," said Brad Baldwin, a Gartner Group analyst.

Peer-to-peer LANs are usually installed in small shops that simply do not need the power of client/server LAN operating systems. Rock Grecious, who manages a seven-user NetWare Lite LAN at Provo, Utah-based U.S. Synthetic Corp., said, "I've worked with client/server before, but we just didn't need a full-blown LAN here."

Life price tag

In these tough economic times, peer-to-peer LAN operating systems have another big advantage: They are inexpensive. Novell is selling its NetWare Lite peer-to-peer LAN operating system for \$99 per node. By comparison, a 10-user package of Novell NetWare costs \$1,995.

Artisoft, Inc. will bundle its LANtastic LAN operating system with its Ethernet cards for \$99 per network — not per node. Sitka Corp., a Sun Microsystems, Inc. subsidiary, will give away a two-user version of its LAN operating system to anyone who can prove they own two network adapter cards.

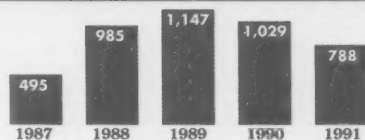
But low prices for the user translate into low profit margins for the vendor. Artisoft, for example, makes only about 10% of its revenue from unbundled LANtastic sales, according to Baldwin. The rest comes from network adapters.

Although users like the low cost of peer-to-peer network operating systems, they overwhelmingly list ease of use and administration as the main rea-

Low-end shrinkage

The DOS-based LAN market is in decline...

Peer-to-peer license shipments (in thousands)



Source: Gartner Group, Inc.

...but has a healthy installed base of nearly 3 million nodes

1991 worldwide installed stations of DOS-based LANs

Manufacturer	Model	Stations	Percent of market
Artisoft	LANtastic	503,055	16.9%
IHM	PCLAN-Prg	996,800	33.4%
3Com	3+Share	210,000	7.0%
Tiara Computer Systems	10NET	650,000	21.8%
Other		624,500	20.9%

Source: Computer Intelligence/Infocorp

Notes: Novell only started selling NetWare in late Q4 1991, so this chart does not reflect Novell's presence

CW Chart: Michael Higgins

OS attack looming

Peer-to-peer network operating system vendors may not be threatened by client/server technology, but they will soon be under attack from a new direction — the desktop operating system itself. Microsoft plans to include a peer-to-peer networking capability in its forthcoming Windows for Workgroups product; Apple Computer, Inc. has bundled networking capability into its System 7.0 operating system.

When peer-to-peer networking goes from inexpensive to free, many analysts expect the current peer-to-peer network operating system vendors to lose some customers, although not right away. "There's been a lot of smoke and hype about what Windows for Workgroups is, but we haven't seen it yet," said Lee Doyle, director of LAN research at International Data Corp.

Stan Schatt, LAN analyst at Computer Intelligence/Infocorp, a Santa Clara, Calif.-based research firm, agreed. "There will always be a market for peer-to-peer NOS. Even after the arrival of peer-to-peer capabilities on the desktop, the fittest peer-to-peer NOS vendors will survive."

son they buy the technology.

"The LAN came with only one manual. You can read it overnight and set it up the next morning, instead of spending days on it," said Jim Garrison, who manages a 45-node Artisoft LANtastic LAN at a Georgia consulting firm. "I used to budget eight hours a week to helping users with LAN problems, but that's dropped down to two or three hours now."

Peer-to-peer LANs are also popular among sophisticated users who want to control their own desktop computing environments. Susan Petros, who manages a 28-node Tiara Computer Systems 10Net LAN at the Hip-

ple Cancer Research Center in Dayton, Ohio, said 10Net LAN lets her scientific users "have control of their own system but still share files, printers and electronic mail. The users have more freedom than they would in a client/server LAN."

Peer-to-peer LANs are even capable of supporting client/server applications in some cases. "We've set up a 386 server, which stores Microsoft Excel and Word, Lotus 1-2-3 and Freelance, WordPerfect and Harvard Graphics," said Charlie Craig, who manages a 45-node LANtastic LAN at Memphis-based home improvements manufacturer Thompson-Formby.

\$ 5 4 5 1 9 2 3 0 9 2 0

By the end of this week Computerworld readers will have spent over \$54.5 Billion on Information Technology this year — representing nearly half of all IT spending to date in 1992.

COMPUTERWORLD

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Source: IDG Research Services, Fall 1991

DEC releases FullSail Ultrix manager

BY MARYFRAN JOHNSON
CW STAFF

With an eye toward easing the burden on Unix systems managers, Digital Equipment Corp. recently launched its FullSail application for managing distributed DEC Ultrix systems.

FullSail is intended for use in managing workgroups of up to 100 workstations and will be expanded later to handle larger networks. While FullSail manages only Ultrix workstations now, DEC is planning to release a client version for Sun Microsystems, Inc. machines in several months.

Comprehensive systems management is a "crying need" in the Unix arena, and FullSail is a reasonable beginning for Ultrix users, said Bill Sines, an analyst at Technology Investment Strategies Corp. in Framingham, Mass. "The product is immature," he added, "but as a basic product for Ultrix, it's not bad."

FullSail is divided into four areas: navigation tools, performance managers, user account managers and file system managers. System administrators can use the file system module, for example, to check the status of all files on the network, monitor disk space or tweak performance

problems. "It's really a nuts-and-bolts application, written by engineers for engineers," Sines said.

Better features

DEC could expand FullSail's appeal to chief information officers and information systems directors, he noted, by broadening the performance manager features to include comparisons with best-case scenarios on other company networks, including DEC's own internal network.

"That would begin to address CIO issues about whether they're really getting top performance utilization from their

networks," Sines said.

With its Motif-based graphical user interface and navigation tool, the product is "like a video game for system managers," quipped one DEC spokesman.

FullSail is part of DEC's overall Polycenter strategy, which encompasses a number of DEC and third-party products for network and systems management. DEC officials said FullSail will eventually be compliant with the Open Software Foundation's Distributed Management Environment.

The application requires the Ultrix operating system Version 4.2 or later. It is scheduled to ship next month. Pricing is \$300 per client license, \$6,000 per server for a database license and \$2,000 per server for an application modules license.

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TCP/IP for DOS added to Desqview/X

BY MICHELE DOSTERT
CW STAFF

Quarterdeck Office Systems has licensed Novell, Inc.'s TCP/IP Transport for DOS for use in its Desqview/X Network Manager (to Other X Systems).

Quarterdeck also announced new support for users of Sun Microsystems, Inc.'s PC-NFS and Transmission Control Protocol/Internet Protocol (TCP/IP) products from The Wollongong Group, Inc. and Beame and Whiteside Software Ltd.

The Santa Monica, Calif.-based vendor's Desqview/X combines a graphical user interface with an implementation of the X Window System under DOS. It requires a third-party TCP/IP transport product, such as Novell's, to connect to TCP/IP networks. Network Manager (to Other X Systems) is the interface required to run Desqview/X on non-DOS networks.

With Desqview/X, the Desqview Network Manager and Novell's TCP/IP driver, DOS users can access programs running on remote Unix workstations, and X workstation users can access DOS and Microsoft Corp.'s Windows programs running on the Desqview/X personal computer.

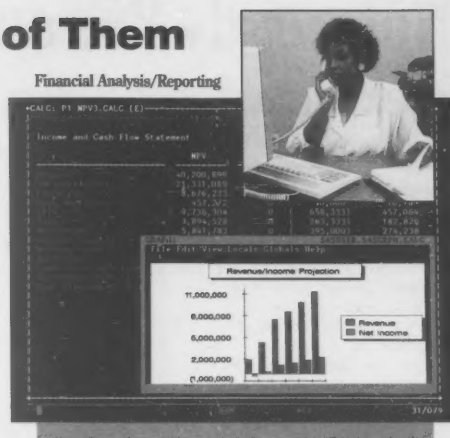
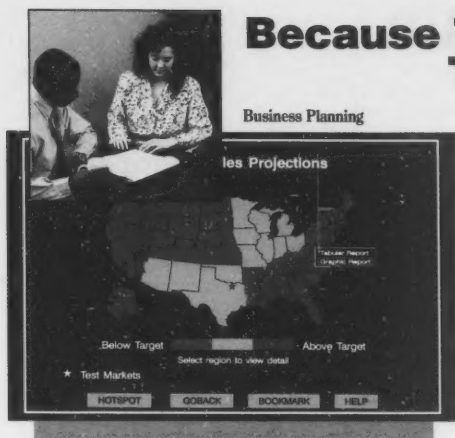
Novell's TCP/IP Transport for DOS contains Novell's Open Datalink Interface driver set, which supports multiple protocols such as TCP/IP and IPX/SPX running simultaneously on the same board. The new TCP/IP drivers, along with the driver for Novell's TCP/IP for DOS product, will be provided free to Desqview/X Network Manager users.

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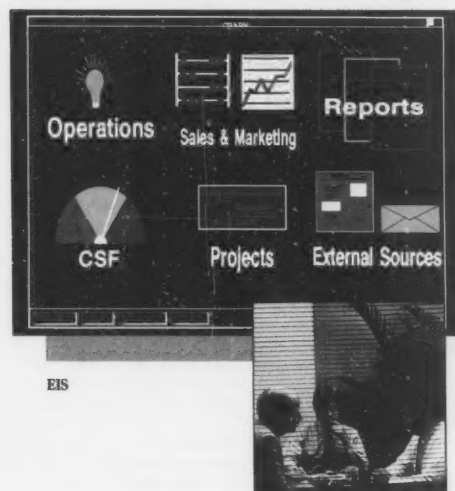
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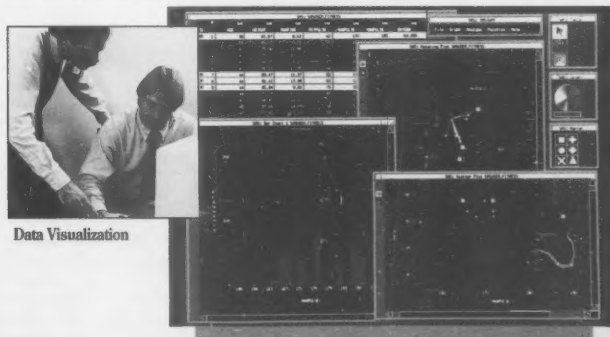
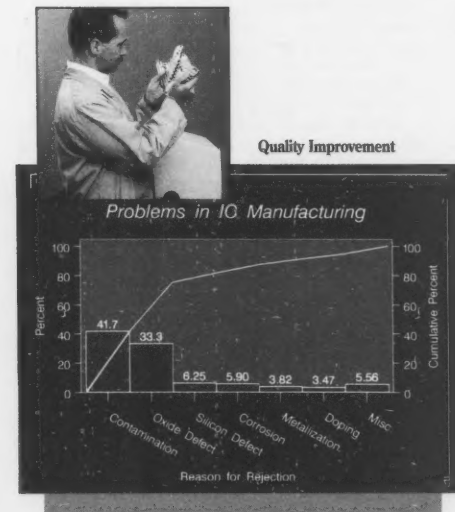
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Net-ready PCs spark user debate

ANALYSIS

BY JOANIE M. WEXLER
CW STAFF

Personal computers with local-area network connections bundled right onto their motherboards are venturing into the marketplace. Yet while PCs and networks become more intertwined each day, opinions differ about the usefulness of integrated communications links.

Some users are itching for PC procurements that shield them from having to install network cards. For example, the city of Milwaukee has already decided that as of next year, all new PCs will come network-ready to allow end users to handle installation and support themselves.

"It is likely that PC purchases will no longer go through our information services group" and will become departmental responsibilities, said Joe Giljohann, senior microcomputer specialist for the city. "So we're seeking some way to cut down on users having to fiddle with boards. Users just answer a couple of questions on the screen" to configure their PCs for a network, he said.

Milwaukee tested Zenith Data Systems PCs with integrated 10Base-T connections, and it took just "four minutes to put the PC on the network after taking it out of the box," Giljohann said.

Zenith Data in Buffalo Grove, Ill., leads the network-ready PC

pack with Ethernet connections bundled into nearly all of its laptop and desktop PCs. The chips contain drivers for Novell, Inc.'s NetWare, Microsoft Corp.'s LAN Manager and Banyan Systems, Inc.'s Vines LAN operating systems. The chip comes bundled with the PCs for free; users buy a \$100 physical con-

nection to interface to cabling. Another PC vendor is soon expected to announce an optional \$120 10Base-T or coax-based Ethernet connection on its desktops, according to analysts. In addition, Artisoft, Inc. said last month it has created an Ethernet chip to market to PC vendors for inclusion on their motherboards.

Is it worth it?

With an average of one in three corporate PCs connected to a LAN, users are unwilling to pay much for an integrated network connection



Source: CIMI Corp.

CW Chart: Michael Siggins

nection to interface to cabling.

"I'm amazed it has taken this long" for PCs to ship with integral connections, said Jim Queen, LAN manager at Enron Gas Services Corp. in Houston. "I buy a network card for every PC; we have no more stand-alone machines," he said. "A PC with an interface means we don't

have to open it, install a card and worry about software switch settings and conflicts with hardware." Queen said he is a bit frustrated because most bundled network connections are limited to 10Base-T connections, and he runs a large Token Ring shop. Zenith Data is focused on Eth-

ernet today because "our studies indicate that about 80% of companies use some form of Ethernet, and it is a simpler chip set to install," a company spokesman said. However, Bruce Fryer, a product strategy manager at the firm, said, "We're very aware of the Token Ring market and are watching it closely."

Dan Snyder, vice president of information systems at Tyson Foods, Inc. in Springdale, Ark., has not been evaluating network-ready PCs because he said he perceives a limited availability of products. "We wouldn't be willing to pay much of a premium for the connection because only

about 30% of our PCs are networked," he added.

"Under \$50" was the price point where Snyder said he would become interested.

Analysts have long anticipated the migration of network connections off modular adapter cards onto chips to provide negligible PC premiums. Yet PC vendors shipping integrated network connections are scarce, in part because users are not sure to what network type they want to be connected, one analyst said.

"It is doubtful in the 1990s whether there will be a [network] period of stability long enough to get these products launched. There is always the next network hanging tantalizingly over the horizon," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consulting firm.

Bill Sheehan, a project leader at Stone & Webster Engineering Corp. in Boston, agreed. "With an adapter, if I'm running a 4M bit/sec. Token Ring and upgrade to 16M bit/sec., I toss out the card. I'd hate to toss out the whole motherboard," he said.

Sheehan evaluated Ethernet-ready Zenith Data laptops last month and found they constrained his ability to manage memory within the PC. "With cards, you can move memory and put it where it's convenient. Where Zenith has blocked out ROM is in high memory, and you can't move it," he said.

IN BRIEF

Tricord beefs up server line

■ **Tricord Systems, Inc.** bumped up its PowerFrame super-server line, releasing four new models built around Intel Corp.'s 33/66-MHz i486DX2 processor. The PowerFrame Models 30/66CB and 40/66CB for the Banyan Systems, Inc. Vines market cost \$26,490 and \$32,490, respectively. Models 30/66C and 40/66C for Novell, Inc.'s NetWare, IBM's OS/2 and Microsoft Corp.'s LAN Manager cost \$26,990 and \$32,990.

■ **QMS, Inc.** began shipping its fastest PostScript printer yet. Dubbed the QMS-PS 3200 and based on LSI Logic Corp.'s RPM3310 processor, it will print 32 page/min. in a networked environment. QMS has added 11- by 17-in. output and duplexing to its features. It has 16M bytes of random-access memory, and a 40M- or 120M-byte internal hard disk can be added. It will also support up to six external Small Computer Systems Interface disks. The base price is \$19,995.

■ It will be a marriage made in storage heaven, or so hopes **Exabyte Corp.**, which is bidding to acquire **R-Byte, Inc.** for \$12 million. Exabyte, a Boulder, Colo.-based maker of backup tapes, wants to leverage San Jose, Calif.-based R-Byte's expertise in 4mm digital audio tape storage.

■ **GigaTrend, Inc.** in Carlsbad, Calif., is now shipping the company's MasterSafe tape backup software. MasterSafe backs up and restores multiple local- and wide-area networks using communications technology that complies with Novell's Storage Management Service. It backs up data over several topologies. MasterSafe's network backups or restores are performed at a tape station on the network rather than on the file server or workstation. MasterSafe is priced at \$2,995.

Task force agrees on PC management plan

Proposed Desktop Management Interface takes aim at controlling hardware and software on PCs

BY MICHELE DOSTERT
CW STAFF

Members of the Desktop Management Task Force (DMTF) have announced convergence on an application programming interface (API) architecture for desktop management.

Although standards consortia — and the standards they promote — often fade into the sunset, analysts said they think the DMTF has enough critical mass to endure and that the standards it is promoting are desperately needed.

Michael Howard, president of Infonetics Research, Inc., a San Jose, Calif.-based market research and consulting firm, said, "As things stand today, you can manage LANs, mainframes, minis and workstations, but managing PCs is almost impossible. This proposal gets us closer to being able to manage the hardware, the software and the whole shebang on the PC. I think we'll see applications developed

to use this standard very soon."

The DMTF comprises Digital Equipment Corp., Hewlett-Packard Co., IBM, Intel Corp., Microsoft Corp., Novell, Inc., SunConnect (a Sun Microsystems, Inc. business) and Synopics Communications, Inc. The group is focused on providing a common set of APIs and compo-

sitions and a Component Interface for component management.

The Management Interface provides a common access method for management applications, regardless of protocol, to process management requests and commands. The Component Interface is a simple method that

"A S THINGS STAND today, you can manage LANs, mainframes, minis and workstations, but managing PCs is almost impossible."

MICHAEL HOWARD
INFONETICS RESEARCH

nent interfaces to simplify the management of desktop computers.

The new API architecture, called the Desktop Management Interface (DMI), has two parts: a common Management Interface for network management appli-

hardware and software vendors can use to enable management of their products.

The DMTF will create test implementations at the Management Interface level for Simple Network Management Protocol (SNMP) and Common Manage-

ment Over LLC standards; other standards will be supported as they gain industry acceptance.

The test implementation for the Component Interface will consist of managed objects, including hardware, software, operating systems and add-in components. DMTF members are considering using the Internet Engineering Task Force's Host Resources Management Information Base draft and other standards as the basis for their Component Interface object definitions.

The SNMP test implementation will be demonstrated in October at Interop '92 Fall in San Francisco. After validating the test implementations, the DMTF will publish a reference document, including Management Interface and Component Interface specifications, sample DMI code and an application for DMI validation. This document will be available free of charge from DMTF members by the end of 1992.

NEW PRODUCTS

Unix

Cyber Software International, Inc. has announced Btrv-Unix, Btrieve functions for the Unix environment.

Btrv-Unix features include compatibility with Novell, Inc.'s return code, auto error log tracking and the capability for an existing Btrieve/DOS application to run in the Unix environment without altering the Btrieve calls. The product also accommodates an unlimited amount of alternate indices and is Btrieve-compatible for error return codes.

The license fee for Btrv-Unix costs \$399.

Cyber Software International
1593 Locust Ave.
Bohemia, N.Y. 11716
(516) 563-1336

LAN hardware

Cabletron Systems, Inc. has introduced the F6069 Desktop Network Interface (DNI) card.

The product is a Fiber Distributed Data Interface (FDDI) adapter for Apple Computer, Inc.'s Macintosh II and Quadra (Nubus) computers. According to the company, the F6069 enhances the Macintosh's performance on applications requiring high bandwidth, such as computer-aided design and manufacturing, digital video and multimedia platforms.

Support for FDDI Station Management Version 6.2 is included, offering compatibility with other FDDI products.

The F6069 DNI card costs \$2,995.

Cabletron Systems
35 Industrial Way
Rochester, N.H. 03867
(603) 332-9400

Workgroup software applications

Aion Corp. has introduced the Aion Logic Management System (LMS).

The product is an end-user application tool that permits users to modify business process rules within Aion knowledge-based applications. The graphical user interface programming facility and the complete object-oriented programming system are implementation facilities that are maintained by Aion LMS.

Users can customize application logic and control, and changes are incorporated into the production application, according to the company.

Prices range between \$2,000 and \$5,000.

Aion
101 University Ave.
Palo Alto, Calif. 94301
(415) 328-9595

Unix

SCH, Inc. has announced Release 3.1 of Qbatch, a Unix job scheduling utility.

Qbatch can use the company's SCH:SAM (Systems Administration Manager) interface. It features additional flexibility to queue management and a sophisticated set of pre- and postjob scheduling variables, the company reported. Users submit jobs by entering the command name and job title via a Quick Entry feature.

Release 3.1 can be accessed directly from SCH:SAM's main menu and oper-

ates in character and X Window System modes.

Prices range from \$395 to \$8,500.

SCH
3 Centennial Plaza
895 Central Ave.
Cincinnati, Ohio 45202
(513) 579-0455

Micro-to-micro

Moses Computers, Inc. has started shipping MosesAll, a peer-to-peer network kit designed for entry-level users who want to build a computer network one personal computer at a time.

MosesAll consists of a network card

with a data transmission rate of 1.79M bit/sec., a copy of MosesNOS 3.0 network operating software and standard telephone wire.

All modes of Microsoft Corp.'s Windows can be supported, including the 386 enhanced mode, the company reported.

MosesAll is priced at \$99 per computer.

Moses Computers
Suite 201
15466 Los Gatos Blvd.
Los Gatos, Calif. 95032
(408) 358-1550

Workstations

The Network Connection, Inc. has introduced the Triumph Local Bus 486/50-

MHz workstation. The system features local bus operation and was designed as a Microsoft Corp. Windows or computer-aided design workstation.

An I/O data transfer rate of 50M byte/sec. can be achieved, according to the company, and the product includes 64M bytes of system memory.

The Triumph Local Bus workstation has a 256/512K direct mapped cache with posted write and 486 burst-mode support. It includes three local bus slots and five XT/AT bus slots.

The Triumph Local Bus 486/50-MHz workstation costs \$3,493.

The Network Connection
1324 Union Hill Road
Alapareta, Ga. 30201
(404) 751-0889



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node, with access to files, applications,
peripherals—every LAN resource he needs.

UDS LanFast products are LAN-resident dial-in/dial-out devices with a built-in V.32 bis/V42 bis modem and an integral LAN adapter card. They support thick, thin or 10BaseT Ethernet or Token-Ring. Three levels of security deny access to unauthorized users, and a second high-speed serial port extends network reach by accommodating an external modem or high-speed digital device.

LanFast is shipped with all necessary hardware and software. It supports standard modems at speeds to 57.6 kbps and popular communications programs such as Procomm Plus Network and Crosstalk Mk. IV.

Take care of your LAN "orphans" by adding LanFast to your network now. For full details, contact UDS at:

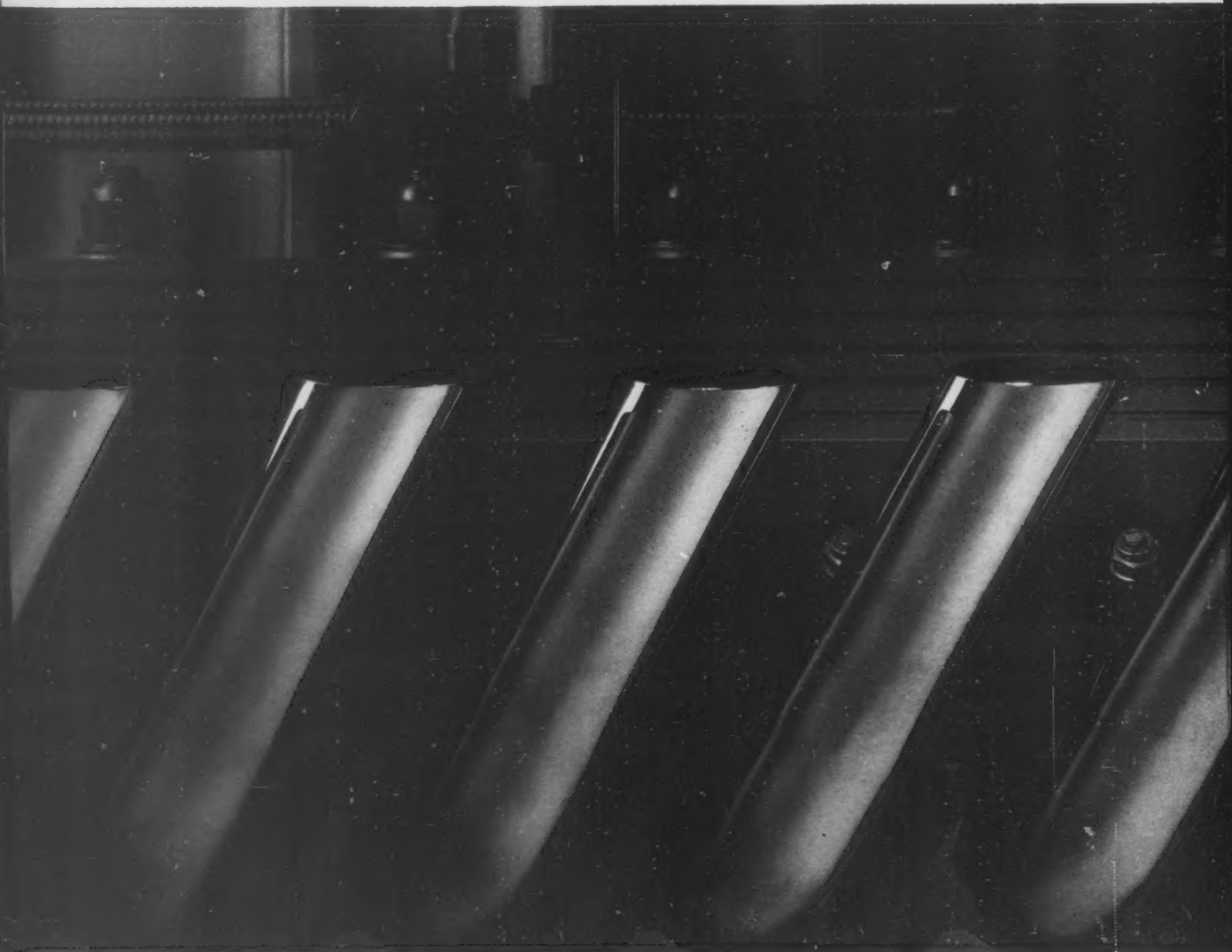
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These days it's popular to say that mainframes are dinosaurs, and if they were anything like the plodding hulks they're made out to be, we'd agree.

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The fact is, we've made so much progress with mainframes lately, it seems odd to call them mainframes anymore. They're designed not to dominate, but to cooperate. Work that our ES/9000's might once have handled alone can now be shared with smaller systems, so big iron's role has definitely changed. But it hasn't diminished.

Client/server computing is a good example. It's often billed as the mainframe's replacement, but



power, new speed, new purpose.

think about that. Client/server systems invite expansion, and as they expand so does the need to manage them.

With thousands of users, in hundreds of locations, on platforms from dozens of vendors, it takes a big system to keep it all going, and systems management is what mainframes do better than anything.

Also, with so many people digging through so much information, it's usually smarter to store it in fewer places than to scatter it all over, and large-scale storage is another mainframe forte. So is mission-critical, 24-hour systems availability.

So instead of replacing mainframes, big client/server systems will demand more of them, which is why IBM Systems/390™ architecture was invented: for openness, connectivity, management, cooperation.

And that's why a leading-edge firm like Waste Management is building its future on IBM ES/9000s for managing a distributed system of over 300 IBM AS/400®s nationwide, serving nearly five million customers. It's a big job. It calls for big iron.

Truth is, the only thing obsolete about mainframes is the notion that they're obsolete.



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ENTERPRISE NETWORKING

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Enthusiasm high over NMS

Users attending tutorial like what they see but voice storage concerns

BY JOANIE M. WEXLER
CW STAFF

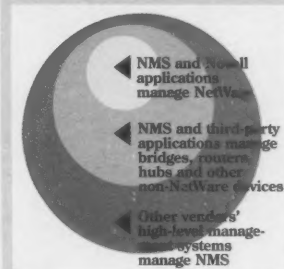
NEW YORK — Users who congregated here earlier this month to learn the ins and outs of Novell, Inc.'s fledgling NetWare Management System (NMS) were enthusiastic about the price, scope and architecture of the product, although several voiced concerns that it might max out their NetWare servers.

Many of the approximately 60 users attending an NMS tutorial at Novell dealership NetLAN, Inc. said they were embarking on searches for a product that will let them centrally manage scattered, mixed-vendor local-area networks.

That quest is fueling their interest in DOS Windows-based NMS, a Novell-created software platform that accepts third-party "plug-in" applications to allow

The NMS platform

The 'software bus' concept of Novell's management system appeals to users



Source: Novell, Inc.

CW Chart: Stephanie Faucher

users to piece together a customized, umbrella management product. NMS reportedly runs at all five levels of the "full" network management system speci-

fied by the Internet Engineering Task Force: network fault, performance, configuration, security and accounting management.

"Most of us are running a large variety of LANs, and finding a standard management platform at a reasonable cost is paramount in our minds," said attendee John Posephney, vice president of systems integration at Lockheed Information Management Systems in Tarrytown, N.Y.

Posephney said his attraction to the product is NMS' \$4,995 price tag and its "open" software platform, which will accommodate applications written by Novell for NetWare environments and by

third parties for managing non-NetWare equipment.

Novell likened NMS to Sun Microsystems, Inc.'s SunNet Manager platform for the Unix world, which Posephney tagged at three to four times the price.

Posephney's experience with the server performance impact of other monitoring tools, however, makes him cautious about how the 600K bytes of random-access memory required for monitoring NetWare servers every seven seconds — which Novell said causes server utilization to spike to 40% — will affect the performance of his mission-critical Oracle Corp. NetWare Loadable Module (NLM).

"I suspect I'm going to have a problem," he said.

Ed McVeigh, a Novell management products division sales manager who led the conference, recommended that users add a megabyte of RAM to accommodate the NLMs. He also explained that users can assign NLMs priority so business-critical applications can be handled ahead of NMS.

Core upgrade

Novell is enhancing its core management platform, although users still await applications from other vendors. Next month's planned NMS 1.1 arrival is expected to do the following:

- Add management of IP devices to Novell's IPX.
- Give users more choices of ways to display networks.
- Plot real-time server CPU usage in graphical form.

However, Alan Novick, an investment banking associate at UBS Securities, Inc. in New York, said he wanted to know that if he were to give other ap-

Continued on page 73

Getting the most out of distributed systems

BY ELLIS BOOKER
CW STAFF

After decades of experience with hosts and terminals, users have become comfortable with how that architecture should work.

Unfortunately, not much of that experience applies to distributed computing environments. Even worse, software-based automated modeling tools for this kind of computing are

still in their infancy.

As a result, the job of implementing distributed systems today is still largely a seat-of-the-pants affair.

"With distributed computing, there are intrinsically an infinite number of distribution options. At the same time, there are an infinite number of information processing locations," said Tom Nolle, president of CIMI Corp., a networking consultancy that is

based in Voorhees, N.J.

Figuring out how to optimize a distributed system — taking into account how an application and its data are spread across one or more networks and processors — "might involve 10,000 options," Nolle added. Most network simulation tools don't fit the bill, analysts said.

Hewlett-Packard Co.'s Software Technology Division in Roseville, Calif., hopes to address the need for distributed computing simulation with PerfView, a management tool for multivendor, client/server Unix networks that includes real-time monitoring. PerfView, which was expected this summer, is now scheduled for commercial release in early October, an HP official said. PerfView's second release will add a capacity planning feature.

Rather than being paralyzed by all these choices, many users are forging ahead, building systems and "waiting to see what happens," according to an analyst. But extrapolating from even a successful distributed pilot to a full-blown, enterprise-wide system with hundreds of users is risky.

"I tell customers who want to do this kind of thing to prototype, prototype and prototype," said Tom Bell, president of Rivendel Consultants, Inc., a capacity planning consultancy in Palos Verdes Estates, Calif. But in the next breath Bell warned, "You just can't assume you can scale your prototype."

But Kerry Stover, executive

director of product management for Andersen Consulting's Foundation computer-aided software engineering (CASE) product, argued that at least some concepts from the mainframe world are applicable to distributed systems.

In June, Andersen announced an updated version of its 9-year-old Method/1 application development methodology that provides both an analysis framework for systems developers working on distributed environments and a project management tool. A part of Andersen's client/server CASE product, Foundation for Cooperative Processing, Method/1 Version 9.0, can also be used with other CASE tools.

According to Stover, one of the most important planning concepts for distributed systems is the so-called queuing theory.

The queuing theory takes

into account the response time and throughput of the processors and I/O devices, as well as the number of jobs that are expected to arrive at these potential bottlenecks. The more distributed the application, the more complex the model.

Right now, there are more performance monitors and systems managers than performance simulators on the market.

"Customers are simply having enough problems bringing servers and users on-line on these systems," explained Frank Moss, president of Tivoli Systems, Inc. in Austin, Texas.

Tivoli is supplying its Wisdom Environment, an object-oriented, distributed systems management product, as the systems manager component in the Open Software Foundation's Distributed Management Environment (DME).

The Tivoli tool will manage items such as network-resident services, peripherals and user-access tables in the DME. The first full release of the DME is due in the second half of 1993.

Bell said the proportionally greater emphasis on performance monitors and systems managers may reflect the fact that vendors and users are still busy gathering data on the distinctive requirements and characteristics of distributed computing applications.

Modeling complexity

All planning tools, whether for mainframes or distributed, open systems, were designed to predict performance based on changes in work load, hardware, communications infrastructure and the number of users on the system.

Distributed computing is more complex to model than host-to-terminal environments because processing takes place in many locations, with transactions typically traversing local-area networks that have performance characteristics of their own.

Analysts said companies that have traditionally provided modeling tools for mainframes — firms such as Systems Center, Inc. in Reston, Va., and Candle Corp. in Los Angeles — are destined to enter this key market.

For instance, in a few weeks, another mainframe player, BGS Systems, Inc. in Waltham, Mass., is scheduled to release Best/1-AIX, its initial performance-modeling product for Unix. BGS' 17-year history has up until now been in modeling and capacity planning for a variety of proprietary environments, including MVS, Systems Network Architecture, VM and VAX.

A sampling

Vendors with distributed computing modeling products

Internetix, Inc., Upper Marlboro, Md.

Product: **Lansim**

Network Design & Analysis Corp., Markham, Ontario

Product: **Autonet/Designer**

Comdisco, Inc., Foster City, Calif.

Product: **Bones PlanNet**

Caci Products Co., La Jolla, Calif.

Product: **Comnet II.5, Lannet II.5 and Network II.5**

CW Chart: Janell Genovese

NetLabs unveils applications set for nontechnies

BY ELISABETH HORWITT
CWSTAFF

LOS ALTOS, Calif. — NetLabs, Inc. has introduced a set of applications that are said to make its sophisticated network management system more accessible to nontechnical users.

The company's original NetLabs/Manager, sold primarily to vendors and huge, technically savvy corporations, was "very high on the functional side but low on usability," company spokeswoman Rosalie Buonauro said.

The product was designed to manage a variety of networks via either the Open Systems Interconnect Common Management Information Protocol or the Simple Network Management Protocol (SNMP), using a graphical user interface.

"Users had to put in quite a

as "What do you have on your network?" and "What type of system is it on?" Buonauro said.

Martin Marietta's Programmable Aerospace Ground Equipment (PAGE) Division has been using the original NetLabs/Manager for about two years to manage the links that support Titan

missile launching systems, according to John Zwiebel, a PAGE network manager.

PAGE uses NetLabs/Manager to "look at communications resources managed by SNMP, like Fiber Distributed Data Interface, and whether the host is up and communicating or not and

traffic levels to and from the host," Zwiebel said.

PAGE chose the product about two years ago because it was the best SNMP system available at the time that ran on an IBM RISC System/6000, he added.

However, Zwiebel agreed

that "someone who doesn't know much about SNMP can certainly use [NetLabs/] Manager, but someone who understands SNMP can really take a lot of advantage of it."

Available now, NetLabs/Assist is priced at \$4,000. NetLabs/Manager is priced at \$12,500. The discovery utility is priced at \$3,000, according to the company.

THE PAGE DIVISION chose the product about two years ago because it was the best SNMP system available at the time that ran on an IBM RISC System/6000.

bit of work to make it productive in their environment," Buonauro said. In contrast, NetLabs' new NetLabs/Assist applications let users get the system up and running in a week, she added.

The applications consist of the following:

- **MetaView** — generates reports and graphs of network data.
- **Action Router** — automatically sends notification of a problem to a designated user or to a printer.
- **Alarm Starter Kit** — provides predeveloped software for setting thresholds and managing problems on several popular local-area network devices. These include hubs from Synoptics Communications, Inc., Chipcom Corp. and Cabletron Systems, Inc., and Novell, Inc.'s Lantern, a LAN monitoring device.

The easier the better

In addition, NetLabs enhanced the discovery utility, which automatically finds all network nodes and represents them on a topological map. The enhancement puts in the connections between the nodes automatically, Buonauro said.

NetLabs also put together software that automatically brings the basic NetLabs/Manager system up and guides the user through configuring the system by asking questions such

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AS A FLOATATION DEVICE.

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Product finds bottlenecks in connections

BY ELISABETH HORWITT
CW STAFF

AGOURA HILLS, Calif. — A product just introduced by Network Telesis, Inc. is said to let users pinpoint bottlenecks in hundreds or even thousands of local-area network-based per-

sonal computer-to-mainframe and PC-to-server connections.

While tools for measuring response time across IBM mainframe networks abound, Net-F/X(A-LAN) is the first product that measures response time across networks that include hosts, servers and PC LANs, ac-

cording to Roger Mahnke, Network Telesis spokesman.

The initial version of Net-F/X was designed to measure response time for PC-to-server and PC-to-host connections that involve OS/2-based PCs. DOS and Microsoft Corp. Windows versions of the product are due

out by year's end, Mahnke said.

Network General Corp.'s Sniffer is said to pinpoint response-time problems across LAN-to-host as well as LAN-to-server connections by generating traffic across such links and analyzing the packets.

However, Net-F/X(A-LAN) may be the first tool of its kind to measure response time by causing traffic to be generated from

both the host and PC end.

The product can be used to establish baselines for typical response time on a given configuration and then measure how response times change when the configuration changes, as when a new server or group of PCs is added to a LAN, Mahnke said. The product consists of IBM mainframe VTAM host software that coordinates the tests on remote LAN nodes and software that sits on each PC on the LANs, Mahnke said.

The VTAM host component provides the power to coordinate response-time testing across multiple PC-to-server and PC-to-host connections concurrently, he added. This means it can be used to collect baseline response-time information across a network of hundreds or thousands of nodes overnight, Mahnke said.

The initial version of the product, due in September, is priced at \$15,000 for the host/VTAM application and master console and \$1,250 for each LAN workstation. Volume discounts are available.

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Enthusiasm over NMS

CONTINUED FROM PAGE 71

plications priority, "would I ever be monitoring my servers?"

Novick was intrigued by the "software bus" concept of NMS, which Novell described as analogous to the computer bus in the hardware world, where users plug bus-compliant modems and network interface cards into the bus.

Novick said that his interest in NMS is to "not be confined" to the wiring hub strategy of UBS' central IS department.

Yousuf Nasir, network administrator at Cuisenaire Company of America, Inc., a New York maker of educational products for children, was heartened by the fact that "NMS allows you to manage down to the adapter card level." This appeals to him, he explained, for determining which of his myriad networked workstations are sending bad packets to the file server.

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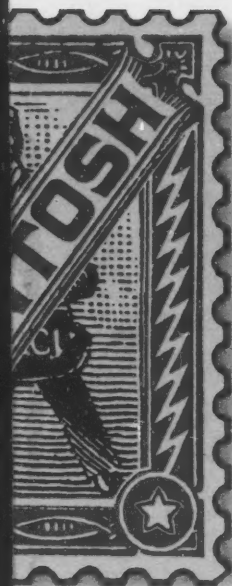
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LAN TIMES
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NEW PRODUCTS

Gateways, bridges, routers

Madge Networks, Inc. has introduced Smart Ringbridge, a stand-alone, IBM-compatible, local Token Ring bridge.

The Smart Ringbridge allows users to forward network traffic at up to 12,500 frame/sec. and transfer data at 16M bit/sec. between two Token Rings. Support for Novell, Inc. NetWare environments is provided, which allows users to forward nonsource router NetWare IPX traffic using standard IPX routing protocols.

Network management software gives users the ability to manage bridges re-

motely from a personal computer connected to the Token Ring network.

Smart Ringbridge costs \$6,995.

Madge Networks
42 Airport Pkwy.
San Jose, Calif. 95110
(408) 441-1300

Dayna Communications, Inc. has introduced PathFinder, a hardware router designed for Apple Computer, Inc.'s AppleTalk.

The product is a single-protocol, LocalTalk-to-Ethernet router that offers three modes of operation. When PathFinder is the only router being used, the Run Mode provides a plug-and-play solu-

tion for connecting a LocalTalk network to an Ethernet network. An Automatic Mode devises a single logical zone of the Ethernet and LocalTalk segments, and a Configuration Mode configures PathFinder as a seed router on an existing internet.

PathFinder features auto-sensing technology and is compatible with 10Base-T, thick, thin and fiber-optic Ethernet wiring schemes.

The product costs \$899.

Dayna Communications
50 S. Main St.
Salt Lake City, Utah 84144
(801) 531-0600

Microcom, Inc. has introduced Microcom Bridge/Router (MBR) Release 6.0.

Two versions of the MBR 6.0 are of-

fered: The MBR/6000 and the MBR 6500. According to the company, the MBR/6000 interconnects Token Ring or Ethernet local-area networks to leased-line wide-area networks at speeds of up to 2M bit/sec. The product also supports V.25 bis remote dialing. The MBR/6500 has four ports and can support up to 15 virtual circuits. Under maximum configuration, 60 virtual connections to X.25 networks and frame relay can be supported.

Prices range from \$3,999 to \$6,499, depending on configuration.

Microcom
500 River Ridge Drive
Norwood, Mass. 02062
(617) 551-1000

Luxcom, Inc. has announced the Series 500 LAN Hub, a local-area network-based connectivity solution designed for IBM environments.

According to the company, the Series 500 connects up to 128 Token Ring or 96 Ethernet stations per hub. Distances of up to 100 meters can be supported on unshielded twisted-pair wiring. The Series 500 LAN can be configured for three different applications: as a LAN-based backbone, a stand-alone concentrator and a satellite hub.

Prices for the Series 500 LAN Hub systems range from \$3,000 to \$16,950 or \$132 per port for a 128-port Token Ring configuration.

Luxcom
3249 Laurelview Court
Fremont, Calif. 94538
(510) 770-3300

Systems Network Architecture

Brixton Systems, Inc. has introduced the BrxLU6.2 Application Programmatic Interface.

The product was designed to allow IBM Systems Network Architecture users to communicate with IBM mainframe applications. Control of conversation-level data transfers is provided via the product's flexible interface. The BrxLU6.2 operates in local- and wide-area networks through Synchronous Data Link Control, Token Ring, X.25 or dial-up lines.

The BrxLU6.2 costs \$3,950.

Brixton
185 Alewife Brook Pkwy.
Cambridge, Mass. 02138
(617) 661-6262

Network management

Intel Corp. has enhanced its version of LANProtect software with additional features and safeguards to protect Novell, Inc. NetWare networks against computer viruses.

LANProtect 1.5 software has improved capabilities for updating virus pattern libraries, technological enhancements for detecting stealth and polymorphic viruses and virus removal functionality for servers and workstations, the company reported. This version offers an optional terminate-and-stay-resident program that provides continuous scanning of DOS and Microsoft Corp. Windows-based workstations that are connected to the network.

The LANProtect 1.5 software costs \$995.

Intel
3065 Bowers Ave.
Santa Clara, Calif. 95052
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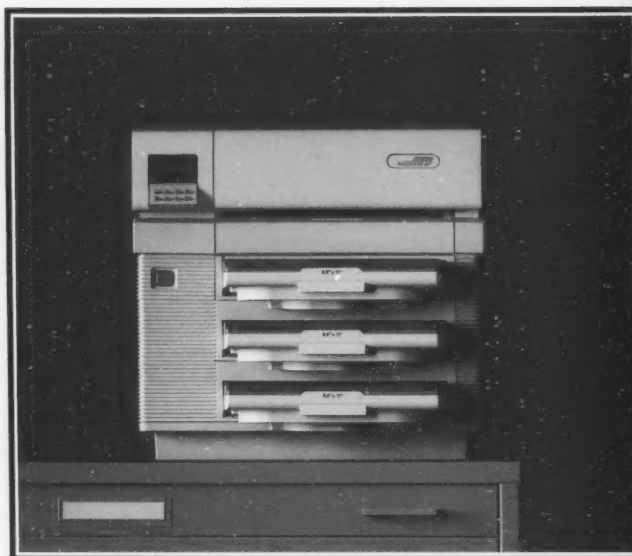
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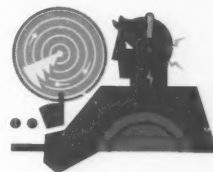
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For more on COMPAQ PAGERMARQ printers, just turn to the next page.



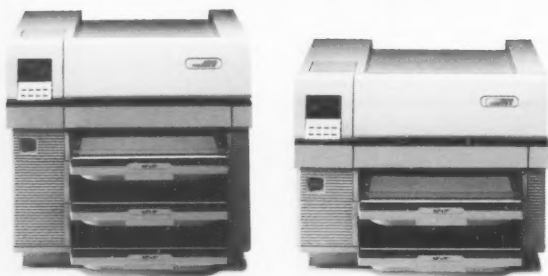
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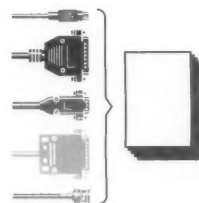
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LARGE SYSTEMS

HARDWARE • SOFTWARE • STRATEGIES

Performance tools learning new tricks — applications

BY JOHANNA AMBROSIO
CW STAFF

You tune your car for performance, so why not tune your mainframe applications?

Increasingly, users are doing just that. Performance tuning has been around for some time, but the concept is now moving beyond systems software and into applications.

Mellon Bank Corp. in Pittsburgh has had a four-person performance unit for several years and recently began focusing more on applications. All told, Mellon saves "a couple of hundred thousand dollars" each year with its tuning efforts, said Donald Greb, technical support division manager at Mellon.

Performance tuning is the process of looking at a piece of software—like a transaction processing monitor or database

management system—and figuring out how efficiently the code is running and where the bottlenecks are. Sometimes these performance issues are hardware-related, like storage or memory, and sometimes the code has to be rewritten or tweaked (see story below).

Traditionally, performance tuning has been applied to the area of systems software by a specialized unit within the information systems department.

New uses for old tools

Performance monitors have long been available from mainframe software vendors including Candle Corp., Legent Corp., Boole & Babbage, Inc. and Landmark Systems Corp.

But there have been few tools to fine-tune an application's performance. Although a couple of packages have been available for

some time—including those from Programart Corp. in Cambridge, Mass., and WindTunnel Software, Inc. in Chicago—they have only recently started to be used by more than a handful of forward-thinking IS shops.

"As applications software becomes a larger monetary portion of the IS budget, people will begin to think to make sure it utilizes resources effectively," said Stephen Hendrick, an analyst at International Data Corp. in Framingham, Mass.

Programart's mainframe-based tuning package, called Strobe, runs on IBM mainframes and is used by more than 750 customers.

WindTunnel's Performance Architek line also runs on mainframes and is geared to tuning applications while they are being developed instead of after the applications are already in production.

Programart is getting ready to announce a package next month for this emerging market. Called APMpower, the OS/2-based package is geared to help applications developers build in peak performance as the application is being written.

This more holistic approach to performance is being touted by Programart as "applications performance management" and by WindTunnel as "proactive performance engineering." In any case, both companies pitch it as a way to improve software quality.

Tony DeDuca, senior director of mainframe development at Automatic Data Processing, Inc. (ADP) in Roseland, N.J., agreed. ADP is building a new payroll system, due to be finished next year, that will run in all 40 of its data processing centers.

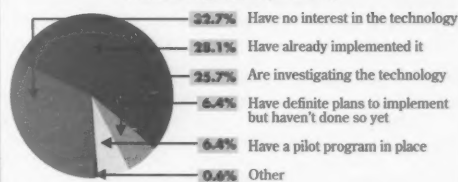
Survey: Client/server computing

Early stages

Less than one-third of respondents have already implemented client/server projects, but most are interested

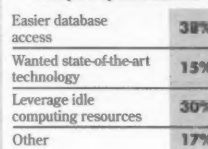
What are your current plans for client/server computing?

Percent of respondents (Base: 171)



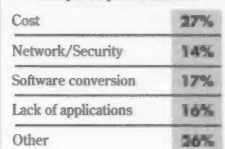
What are your reasons for adopting client/server computing?

Percent of respondents (Base: 70)
Multiple responses allowed



What do you consider the most significant obstacle to client/server computing?

Percent of respondents (Base: 100)
Multiple responses allowed



Source: CW Database Division

CW Chart: Stephanie Faucher

Eye for detail

Applications tuning packages essentially analyze how much of a computer's horsepower a particular applications module uses. For example, Programart's Strobe generates reports that show how applications are running. Strobe takes snapshots of resource utilization at defined intervals while the application is running.

The following is some of what applications tuning packages look for:

- How much CPU horsepower is consumed by specific SQL statements or series of statements.
- Direct-access storage device requirements for the data that the application requires and how quickly that data is accessed.
- How much code is needed to perform a specific function or series of functions.
- The number of I/Os needed by the application.

JOHANNA AMBROSIO

The company is using Programart's Strobe "to show the incremental performance increase or decrease every step along the way," DeDuca said.

Most importantly, he said, "some of the results have caused us to change things in the system—internal vs. external sort, some Cobol II verbs. We don't want to wait until production to find out what's wrong."

Loosening the ties

As more tools are becoming available to help make applications hum, the roadblock within the IS organization itself is also starting to be, well, tuned.

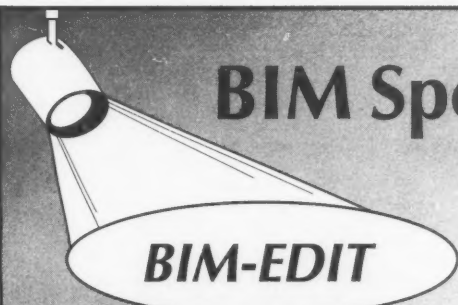
"Applications programmers are more willing to include tuning items in the project," Greb said.

Tuning "can help reduce the cost of the product" by making it run more efficiently.

"When I first came here, I was looked at as the spy from the CIA," said John Fair, technical specialist at US Air in Winston-Salem, N.C. "But one of the things we're getting good at is letting the applications people know we're here to help."

Still, performance-prediction tools are no panacea. "When you're in test, some things don't show up until you have the full load," Greb said.

For example, Fair said, DB2 may not choose the same path to data with the test database as with the production database. "It's really hard to rely totally on diagnostic tools. A lot of it is gut."



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DEC's Ingres unbundling draws yawns

MELINDA-CAROL BALLOU
CW STAFF

Digital Equipment Corp.'s decision to discontinue its bundling of the Ingres relational database management system with its Ultrix operating system will have little impact on the majority of Ultrix users. Many users did not take advantage of the runtime RDBMS license anyway.

For instance, out of 32 Ultrix users questioned last week, only one had attempted to use Ultrix SQL. Many said they needed a development version of the Ingres RDBMS or else the product was of little use to them.

Ingres Products Division, a division of The Ask Cos., will offer a migration kit to move the Ultrix SQL user base—estimated by industry sources at nearly 10,000 out of 75,000 Ultrix licensees—to the development version of the RDBMS, Version 6.4. DEC officials refused to confirm that installed base figure, saying they had no way of knowing how many Ultrix SQL users exist.

DEC is required by law to inform users about the termination of the licensing program, and it is sending out a mailing to all customers who have valid Ultrix service contracts to let them know, officials said.

Oracle Corp. and Informix Corp. are also offering a migration program for Ultrix SQL users that will enable them to move their data and applications across to the Oracle and Informix RDBMSs.

Other options

DEC will explore a variety of alternatives for DEC products, such as DECmc Director, that work in conjunction with Ultrix SQL, sources said.

Meanwhile, users interviewed last week said they had found little opportunity to use the runtime license.

"It's one of those things that was kind of neat, but we were busy with other things and never got around to using it," said Bill Brown, a systems manager at Occidental Fire & Casualty, an insurance company based in Scottsdale, Ariz.

The termination of the agreement with Ingres leaves DEC without an RDBMS of its own for the Unix market until it ships Rdb for OSF/1 sometime next year, according to DEC officials.

Industry analysts said this strategy underscores DEC's commitment to both Rdb and OSF/1 on its upcoming Alpha platforms. In a comparable move, DEC recently unbundled runtime Rdb from Open VMS.

Users plan for life after Wang bankruptcy

KIM S. NASH
and THOMAS HOFFMAN
CW STAFF

LOWELL, Mass. — Just hours after filing for bankruptcy protection, Wang Laboratories, Inc. was ejected from Standard & Poor's Corp.'s 500 index of public companies and replaced by Unix systems maker Sun Microsystems, Inc. This change is a microcosm of a larger shift in the industry from proprietary systems to open systems with better price/performance ratios.

And Wang users know it.

Wang's new status as the biggest computer maker ever to file Chapter 11 scared some on-the-edge users into making plans to vacate the VS minicomputer.

For others, the handwriting on the wall was bold enough to spur managers to draw up and execute contingency plans months or even years ago.

A recent survey of 256 Wang users by the CW Database Division confirmed this discomfort. Thirty-eight percent of VS shops surveyed said they would stick with existing hardware for the short term and another 43% said they are looking for another hardware vendor.

Migrations can be made wholesale or piecemeal, gradually or immediately. Changeovers can be guided by in-house information systems expertise or that of third-party firms that specialize in VS conversions, such as Cedarhurst Technologies, Inc. in Cedarhurst, N.Y., or Magna Computer Corp. in Salem, N.H. Competing vendors such as Digital Equipment Corp., Data General Corp. and IBM also tout strategies to lure VS users.

The following is a sampling of typical VS migration plans and their projected benefits:

Company:
American Express Co.
Wang setup:
Two VS minicomputers
Replacement:
Mix of Unix workstations and PC LANs
Status:
Will be done end of 1992
Benefits:
Projected savings of two-thirds the cost of annual VS maintenance; more functionality

American Express' corporate headquarters in New York has not bought a new VS in four years. In fact, the company will replace its Model 7310 and Model 300 by December.

The Wang minicomputers currently handle office applica-

tions and a 17,000-name electronic-mail system that links American Express with related companies Shearson Lehman Brothers, Inc. and the American Express Bank. But not for long.

Unix workstations from Hewlett-Packard Co. are already in place in some departments, along with an ever-growing local-area network of IBM-compatible personal computers linked to each other, IBM mainframes and outside news wire services.

Better features

The new system provides more processing power and cheaper memory compared to Wang machines, according to Joseph Caruso, director of corporate systems and technology.

In-house programmers are doing required software rewriting. In many cases, however, American Express is buying PC packages to replace former VS tasks such as word processing and financial reporting software.

Economics and enhanced functionality drove American Express to make the change, but so did the relative ease of backup of the desktop boxes, Caruso said. Although he acknowledged that the VS models failed "infrequently," when they did, hundreds of users were affected.

"But now processing doesn't have to stop because it's distributed over a large number of workstations," Caruso explained.

Company:
Hurt, Richardson, Garner, Todd and Cadenhead
Wang setup:
One high-end VS
Replacement:
Possibly PC LANs
Status:
Planning for new hardware, maintenance provider
Benefits:
Projected annual savings of \$50,000 on VS maintenance

A Wang user for nearly 10 years, Atlanta-based Hurt, Richardson is now studying alternatives to a 3-year-old VS 10000, which is the hub of the law firm's \$750,000 Wang installation.

The high-end VS processor controls billing and legal document processing systems and could be replaced with PC-based networks, according to Chris Drumm, MIS director.

"We already have more than 40 desktops linked, so that seems to be a good direction for us," Drumm said.

In the meantime, the law firm

is looking closely at shifting its \$100,000 VS maintenance contracts from Wang to third-party players, such as ICA, Inc. in Atlanta or Intellogic Trace, Inc. in San Antonio.

Drumm said he worries that Wang's impending 5,000-employee layoff will affect service. "Where are those [laid-off] people coming from? Maintenance is our biggest concern," he said.

Going to an independent service provider will reassure company management as well as save money.

For example, ICA has offered a 50% discount on fees currently charged by Wang. Wang is willing to match some aspects, but "won't budge on systems software prices," Drumm said.

He said he will make a final decision after LawNet, Inc.'s annual conference, scheduled for early September. LawNet, which was formerly a VS-only user group, recently changed its charter to include legal firms running equipment from vendors other than Wang.

Company:
YMS Management Associates, Inc.
Wang setup:
One VS minicomputer
Replacement:
IBM Application System/400
Status:
Done
Benefits:
Similar look and feel to applications

YMS, a financial management company based in New York, contracted with nearby Financial Technologies to migrate more than 1,000 VS-based programs to an IBM Application System/400 Model B45 late last year.

"Management here was nervous about Wang's money problems," said Kevin Saal, director of MIS.

The \$70,000 conversion was done inside of three months, which included testing of the revamped programs.

The biggest benefit of the new configuration is nothing—that is, the 10 users who have used Wang's VS interface for several years see no difference in the look and feel of the AS/400 applications, Saal said. "Financial Technologies was able to convert everything, but it doesn't look fiddled with," he said.

Saal also reported quicker response time to user requests.

Company:
GTE Services Corp.
Wang setup:
10 VS minicomputers
Replacement:
Novell, Inc. NetWare LANs
Status:
Done
Benefits:
Projected savings of \$1.5 million per year in hardware upgrade costs and fees for maintenance and operating system licenses

The Stamford, Conn.-based financial services and human resources arm of telecommunications giant GTE Corp. unplugged the last of its 10 VS minicomputers in April.

GTE Services replaced the Wang machines with a Novell, Inc. LAN linking IBM PCs and Apple Computer, Inc. Macintoshes. All conversion work was done in-house.

The LAN is more flexible than the VS-centric network because it supports hardware from multiple vendors.

"We didn't see [Wang] bringing about the technical innovation we needed," said Joseph Rasmussen, director of IS technologies.

For example, minicomputer development suffered when Wang entered the image processing market in 1987, according to Rasmussen. Wang built fewer operating system extensions when it began concentrating on imaging, he said.

Poor prognosis

GTE Services said it decided to ditch Wang 18 months ago because it does not give the now-bankrupt company good odds for survival. Besides contending with an increasingly poor financial condition, Wang caused customer ill will by jacking up license fees for VS operating system software, Rasmussen said.

Wang charges between \$1,000 and \$100,000 per license for VS operating system software, a practice approved by a federal judge in California who ruled on a September 1991 antitrust suit brought against the vendor by TSJ, Inc., a reseller in Southern California. Five other resellers later joined the suit.

According to a Wang spokesman, these fees "provide Wang fair return on the investment we make in developing and upgrading the operating system."

He added that one uniform policy ensures that Wang users pay the same price for VS operating system software.



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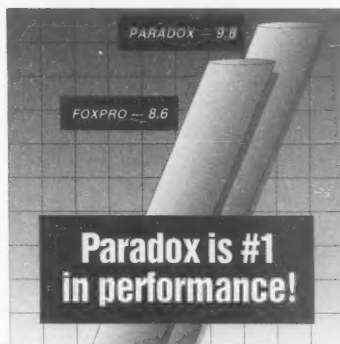
A new Windows-like interface makes using Paradox 4.0 more intuitive than any other database. The context-sensitive SpeedBar™ gives you instant access to your frequently used commands and features. Movable, resizable windows, pull-down menus, dialog boxes, and mouse support make creating and editing your database simple.

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Software Digest's NSTL May 1992 report rates Paradox highest of all databases tested in Overall Power and Performance.

unlimited text anywhere in your application. Plus you can store anything you want in the new binary field—documents, bit-mapped graphics, multimedia data—and manipulate it under program control.

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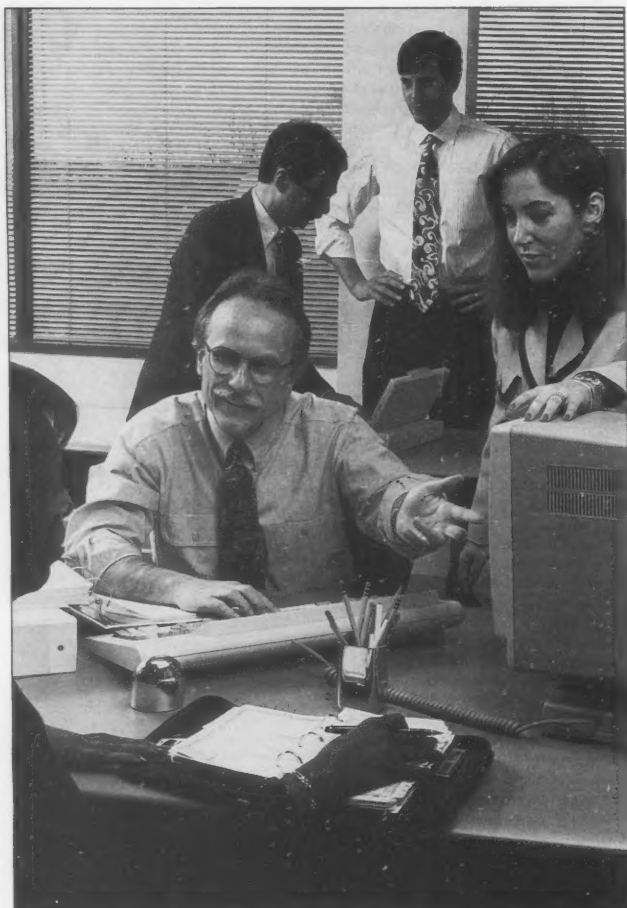
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NEW PRODUCTS

Software application packages

NewGeneration Software, Inc. has started shipping Release 4.0 of the company's Interactive Query data retrieval and report writing software.

The software was designed to help users retrieve time-critical information from the IBM Application System/400 or System/38 database without programming, the company said.

Improvements in this release have cut the query execution time by up to 50%. Files can be joined on new or derived fields, and the product can generate files that can be accessed by PC Support/400 users from their personal computer applications.

Pricing for Release 4.0 of Interactive Query ranges from \$590 to \$22,500.

NewGeneration Software
Suite 195
1010 Hurley Way
Sacramento, Calif. 95825
(916) 920-2200

Database management

BMC Software, Inc. has announced three administrative

products for DB2: Release 3.1 of Catalog Manager, Alter and DASD Manager.

Catalog Manager has a single interface that allows users to execute most DB2 administrative functions such as automating utility generation and creating ad hoc queries and reports.

A security enhancement in Alter grants public or private access to a Work identification, and the product has improved object support and a number of ease-of-use features, the company reported.

Prices start at \$8,000.

BMC Software
1 Sugar Creek Center Blvd.
Sugar Land, Texas 77487
(713) 240-8800

Revelation Technologies, Inc. has announced OpenEngine 1.5, a database and data access engine.

The product consists of a full-featured relational database, ANSI-standard SQL and intelligent gateway access to multiple data sources.

A database fourth-generation language called Real is used for application logic construction. OpenEngine 1.5 has new features in the application program-

ming interface layer and now has the capability to call for Microsoft Corp.'s Windows Dynamic Link Library routines from within the Real programming language.

OpenEngine 1.5 costs \$595.

Revelation Technologies
181 Harbor Drive
Stamford, Conn. 06902
(203) 973-1000

BGS Systems, Inc. has announced the DB2 Support Facility (DSF).

The product was designed to help users understand hardware resources needed to achieve good performance in DB2 applications. According to the company, DSF highlights occasions when the DB2 application performance could be improved via short-term tuning functions.

A picture of DB2 application resource consumption and performance is created when the DSF combines multiple DB2 measurement sources. DSF is used in conjunction with BEST/1, the company's modeling tool for capacity planning and performance management.

The base price for DSF is \$24,500.

BGS Systems
128 Technology Center
Waltham, Mass. 02254
(617) 891-0000

System software

Legent Corp. has announced Astex 1.5, an Automated Storage Expert product designed for managing data storage.

According to the company, Astex 1.5 features an Allocation Director that anticipates and prevents response-time conflicts by automatically placing data. Astex 1.5 automates the cache tuning process and can suggest solutions to response-time problems.

Prices for Astex 1.5 range from \$17,600 to \$62,100.

Legent
8615 Westwood Center Drive
Vienna, Va. 22182
(703) 734-9494

Turnkey systems

Diamond Micro Solutions, Inc. has introduced a turnkey document imaging application for processing and managing large amounts of paperwork.

The DMS Document Imaging Solution uses Sun Microsystems, Inc.'s SPARCstation and incorporates Oracle Corp.'s database and optical storage technology. Documents can be pulled up for review or transmission via fax or modem to other sites,

where they can be searched by subject, scaled for viewing size and viewed in multiple windows. The product is capable of handling paper and graphic images, microfilm, microfiche and aperture cards.

Prices range from \$70,000 to \$85,000.

Diamond Micro Solutions
1615 Alvarado St.
San Leandro, Calif. 94577
(510) 351-4700

Processors

Electronic Associates, Inc. has introduced Starlight, a simulation computer.

The product was designed for advanced real-time hardware-in-loop simulation computing. According to the company, the system is capable of solving different equations 10 to 100 times faster than conventional simulation computers.

A data flow processor and a parallel compiler are included, which optimize the simulation processing.

Starlight prices range from \$100,000 to \$200,000.

Electronic Associates
185 Monmouth Park
Highway
West Long Branch, N.J.
07764
(908) 229-1100

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Atlanta, GA Atlanta Marriott Marquis Tuesday, October 6	Dallas, TX Marriott Park Central Tuesday, October 13	Los Angeles, CA Westin Bonaventure Tuesday, September 22	Princeton, NJ Hyatt Regency Tuesday, October 13
Boston, MA The Westin Hotel Tuesday, November 17	Denver, CO Denver Marriott West Thursday, September 24	Minneapolis, MN Minneapolis Airport Marriott Thursday, October 22	San Francisco, CA Sheraton Palace Thursday, September 24
Chicago, IL Chicago Marriott Downtown Thursday, September 17	Detroit, MI Hyatt Regency Wednesday, November 4	New York, NY Helmley Palace Wednesday, September 30	Santa Clara, CA Renaissance Ctr-TECHMART Wednesday, September 23
Cincinnati, OH Marriott Tuesday, December 1	Houston, TX Hyatt Regency Wednesday, October 14	Orange County, CA Irvine Hyatt Regency Thursday, October 8	Washington, DC Hyatt Regency Crystal City Tuesday, September 29

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Andersen's Foundation For Cooperative Processing CASE product does what other CASE vendors only promise: designs and generates code for client/server applications.

DATAMATION—SEPTEMBER 1, 1991

Considering how much has been written about CASE tools for cooperative processing, we thought you would appreciate an executive summary.

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BUYERS' SCORECARD

Microcom's Virex nets highest user satisfaction

BY DEREK SLATER
CW STAFF

Antivirus software users can be a difficult group to please. Industry analysts note that users have historically been very suspicious of antivirus vendors and typically are only as satisfied with their software as the results of their last unsuccessful computer virus battle.

There is still the occasional horror story. One user responding to the *Computerworld* Buyers' Scorecard on antivirus software reported that his package zapped a major system function after mistaking it for an infection. Many others operating under Microsoft Corp.'s Windows or other graphical user interfaces noted a variety of crashes and mishaps.

Overall, however, users surveyed indicated a reasonable level of satisfaction with their installed antivirus software. Microcom, Inc.'s Virex topped the poll with a final score of 84, followed by Central Point Software, Inc.'s Anti-Virus at 80 and Symantec Corp.'s Norton Anti-Virus at 79. (The highest possible score was 100.) Of the 132 users surveyed, only 10 said they do not trust antivirus software vendors.

The three products surveyed garner the lion's share of the market among large user companies in the U.S., according to the International Computer Security Association. A shareware program, McAfee Scan, has a very large installed base as well.

A number of other products, including Certus International, Inc.'s Novi, Dr. Solomon's Toolkit (marketed by Ontack Computer Systems, Inc.) and Virus Buster from Leprechaun Software Ltd., divide the remainder of the market.

Microcom's Virex (\$99.95) runs on Apple Computer, Inc. Macintosh systems as well as personal computers. Virex stays resident in the computer's random-access memory (requiring about 1K byte of RAM, according to Microcom). The product scans for known virus strains and uses checksums to watch for new types of viruses.

Virex scored well in system resource requirements, indicating that users approve of its terminate-and-stay-resident method. It also placed highest in the category of overall ability to protect information.

However, Virex earned a relatively low grade in local-area networking capability (it supports only Novell, Inc.'s NetWare) and placed behind its competitors in ease of use.

Central Point's Anti-Virus is an expanded version of the program included in the company's PC Tools utility package. The PC Tools version detects viruses but does not provide a way to cleanse infected files.

Users rated Central Point Anti-Virus highly in accurate detection and identification of viruses. According to the company, the product scans for more than 1,200 known viruses. It is capable of detecting new types of viruses, including stealth varieties, which elude normal detection methods such as file-size checks. (Files infected with a stealth virus appear to remain their original size by feeding incorrect information to the operating system.)

Central Point Anti-Virus is offered for the DOS and Windows platforms at \$129 each.

Symantec's Norton Anti-Virus (\$129) makes its way into the market through inclusion with the Norton Desktop for Windows package as well as through individual sales. Norton

Antivirus software

Total scores reflect average user ratings for all measured areas, weighted by user-assigned importance. Response base: Virex, 32; Central Point Anti-Virus, 50; Norton Anti-Virus, 50.

Total possible score **100** Mean score **81**

Product	Highest ratings	Lowest ratings
Microcom's Virex SCORE 84	Virus detection and identification Effective removal of viruses Overall ability to protect data	Local-area networking capability Ease of use Report generation capabilities
Central Point Software's Anti-Virus SCORE 80	Effective removal of viruses Virus detection and identification Overall ability to protect data	Local-area networking capability Interoperability with other applications Frequency and distribution of updates
Symantec's Norton Anti-Virus SCORE 79	Effective removal of viruses Ease of use Overall ability to protect data	Local-area networking capability Frequency and distribution of updates Speed

Anti-Virus runs under DOS and Windows and supports a variety of networks, including Banyan Systems, Inc.'s Vines, NetWare and IBM's OS/2 LAN Manager; however, it earned a low rating in the area of local-area networking (6.8). Some users indicated that the product is too slow and lacks centralized control in networked environments.

Norton Anti-Virus uses a common technique for removing viruses. It automatically makes backup copies of boot sector data and critical files; if one of these areas becomes infected, the altered version is erased and the

backup copy restored in its place.

Version 2.0, the most recent release, places this information in a single file, rather than consuming additional resources by creating individual backup files.

Overall, users gave Norton Anti-Virus good scores in the most important categories, including ability to protect data and effective removal of viruses.

Users rated only their own products in 15 specific areas. They also rated the relative importance of each evaluation area. (See the methodology on the following page for a description of the rating process.) •

RATINGS IN ORDER OF IMPORTANCE

Microcom's Virex tops five of the six most important categories, but drops to third in ease of use.

(Additional ratings on next page)

User importance rating:

9.6 Accurate detection and identification of viruses

Microcom	9.3
Central Point	8.4
Symantec	8.2

9.4 Overall ability to protect data

Microcom	8.8
Central Point	8.4
Symantec	8.4

9.4 Effective removal of viruses

Microcom	8.9
Symantec	8.7
Central Point	8.5

8.6 Ease of use

Symantec	8.5
Central Point	8.1
Microcom	7.8

8.5 Quality of vendor support

Microcom	8.5
Central Point	7.8
Symantec	7.8

8.4 Interoperability with other installed applications

Microcom	8.4
Symantec	7.8
Central Point	7.6

RATINGS IN ORDER OF IMPORTANCE

Central Point's Anti-Virus earns first place in local-area networking capability, while Virex dominates the remaining ratings.

(Antivirus software, continued from previous page)

8.4 Value for the dollar

Microcom	8.4
Symantec	7.9
Central Point	7.9

8.3 Limited number of false alarms

Microcom	8.7
Central Point	8.3
Symantec	8.1

8.3 Frequency and easy distribution of updates

Microcom	8.3
Central Point	7.6
Symantec	7.1

8.1 Documentation

Microcom	8.2
Central Point	7.9
Symantec	7.8

8.1 Responsiveness of vendor service

Microcom	8.4
Central Point	7.9
Symantec	7.6

7.8 Speed

Microcom	8.0
Central Point	7.9
Symantec	7.5

7.7 System resource requirements

Microcom	8.6
Central Point	7.8
Symantec	7.8

7.6 Local-area networking capability

Central Point	7.1
Microcom	6.9
Symantec	6.8

6.6 Report generation capability

Microcom	8.0
Symantec	7.9
Central Point	7.8

Verbatim

What do you like best/least about this product?

(Based on the most frequently stated answer. Quotes are selected from users' responses.)

Virex

Likes

Ease of use
"It is easy to use — very customizable."

Dislikes

Limited features
"It doesn't automatically examine files from bulletin boards or E-mail."

Anti-Virus

Likes

Ease of use
"We like the clarity of operation. You can see what it's doing at all times."

Dislikes

Poor detection
"It doesn't catch a large percentage of viruses."

Norton Anti-Virus

Likes

Ease of use
"It's easy to use and has a common user interface with other Symantec products."

Dislikes

Incompatibility
"We've experienced some application incompatibility."

Loyalties

Would you buy the product again?

(Reasons based on most frequently stated responses)

Virex

Response base: 32

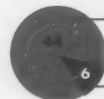


Number of respondents

Likely
The reason:
Does the job

Anti-Virus

Response base: 50



Number of respondents

Likely
The reason:
Works well

Unlikely
The reason:
Better products available

Norton Anti-Virus

Response base: 50



Number of respondents

Likely
The reason:
Satisfied with product

Unlikely
The reason:
Better products available

Vital statistics

Total number of respondents: 132

What is your position?

IS director	5
IS manager	6
PC manager	16
PC technical support staff	40
Network/LAN administrator	11
Data security manager/other	54

How long have you been involved with anti-virus software?

Five years or more	21
3-4 years	36
1-2 years	54
Less than one year	21

What is your responsibility for anti-virus software?

Evaluate or recommend vendors	121
Determine need	115
Select vendors	108
Set standards for your organization	107
Approve or authorize purchase	72

In what industry does your company do the majority of its business?

Manufacturing	29
Government agencies	16
Utilities	10
Financial services	8
Health care	7
Retail	7
Other	55

METHODOLOGY

Products included in *Computerworld's* Buyers' Scorecard are installed base leaders in North America among commercial antivirus software packages.

User names were obtained from a combination of vendor and nonvendor sources. First Market Research, an independent data collection company in Austin, Texas, conducted the survey and tabulated the results. The response base was 50 users each for Symantec Corp.'s Norton Anti-Virus and Central Point Software, Inc.'s Anti-Virus and 32 users for Microcom, Inc.'s Virex.

Users rated their satisfaction with their installed products but were not asked to compare or rate one product directly against another in the Scorecard.

To compute the overall score for each product, we performed the following steps:

1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score.

2) Repeat the process for all remaining categories.

3) Average the resulting figures for the average weighted score.

4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10. Numbers were rounded off where necessary.

A large majority of the respondents (76%) indicated that they have been using their current antivirus package for one year or less. One-third of the users reported that their company has lost data within the last year because of a virus infection.

The most frequently requested improvement users said they would like to see in antivirus software is more reliable virus detection and removal. Users also requested more options and capabilities such as automatic bulletin board service downloads, the ability to quickly install and uninstall antivirus software and event-triggered alarms in networked environments. Improved networking, improved software compatibility and better speed were other commonly mentioned improvements.

In response to a separate question about overall satisfaction, users rated the products as follows: Virex: 8.3, Anti-Virus: 7.9 and Norton Anti-Virus: 7.8.

ACKNOWLEDGMENTS

Computerworld thanks the following individuals and organizations for their assistance in preparing this Buyers' Scorecard: CW Database Division; David Stang, International Computer Security Association; and Robert Bales, National Computer Security Association.



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 20. Finance/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government - State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Refining/Agric.
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 90. Computer/Peripheral Dealer/Distributor/Retailer
 95. Other _____
 (Please specify)

2. **TITLE/FUNCTION** (Circle one)
IS/MIS/DP MANAGEMENT
 19. Chief Information Officer/Vice President
 Asst. VP IS/MIS/DP Management
 21. Dir./Mgr. MIS Services, Information Center
 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr.; PC Mgr.
 23. Dir./Mgr. Sys. Development, Sys. Architecture
 31. Programming Management, Software Developers
 41. Engineering, Scientific, R&D, Tech. Mgt.
 60. Sys. Integrations/VARs/Consulting Mgt.
CORPORATE MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer
DEPARTMENTAL MANAGEMENT
 51. Sales & Mktg. Management
 70. Medical, Legal, Accounting Mgt.
OTHER PROFESSIONAL MANAGEMENT
 90. Educator, Journalists, Librarians, Students
 95. Other Titled Personnel

3. **IS INVOLVEMENT** (Circle all that apply)
 Please indicate your involvement in IS/MIS/DP:
 A. Manage/Supervise IS/MIS/DP Staff
 B. Recommend/Specify IS Equipment
 C. Purchase IS Equipment
 D. End-user of IS Equipment
 E. No Involvement

E4235-0

1. **BUSINESS/INDUSTRY** (Circle one)
 10. Manufacturer (other than computer)
 20. Finance/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government - State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Refining/Agric.
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 90. Computer/Peripheral Dealer/Distributor/Retailer
 95. Other _____
 (Please specify)

2. **TITLE/FUNCTION** (Circle one)
IS/MIS/DP MANAGEMENT
 19. Chief Information Officer/Vice President
 Asst. VP IS/MIS/DP Management
 21. Dir./Mgr. MIS Services, Information Center
 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr.; PC Mgr.
 23. Dir./Mgr. Sys. Development, Sys. Architecture
 31. Programming Management, Software Developers
 41. Engineering, Scientific, R&D, Tech. Mgt.
 60. Sys. Integrations/VARs/Consulting Mgt.
CORPORATE MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer
DEPARTMENTAL MANAGEMENT
 51. Sales & Mktg. Management
 70. Medical, Legal, Accounting Mgt.
OTHER PROFESSIONAL MANAGEMENT
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APPLICATION DEVELOPMENT

CASE • LANGUAGES • TOOLS

Windows builders eye promise of C generators

Programmer performance may be four times greater with developer aids

BY GARRY RAY
CW STAFF

In the face of downsizing and budget crunches, many programmers are turning to a new generation of C code generators that dramatically speed applications development for Microsoft Corp.'s Windows.

The tools, which lack the capabilities of a full-blown computer-aided software engineering (CASE) environment, allow pro-

grammers to design and test applications visually and to then generate C program code in as little as one-tenth the time required to hand-code Windows applications. In effect, application generators combine prototyping, designing and coding into a single step of the development life cycle.

"My performance increase [in generating Windows applications] is four times greater, and much more for program revision," said Jim DeLong, president of Database Administrators, Inc. in Waukesha, Wis.

DeLong, whose company recently completed a salary compensation system for employee-benefits consulting firm William B. Mercer, Inc. in Louisville, Ky., has been beta-testing Knowledgepro for Windows++ from Knowledge Garden, Inc. in Setauket, N.Y.

The tool allows programmers to visually develop user interfaces for Windows applications and to write internal program functions using a proprietary development language. Once completed, the tool generates ANSI standard C++ code and supporting files that are compatible with Microsoft's C/C++ 7.0 compiler, according to Knowledge Garden President John Slade.

Unlike traditional CASE tools, most of

which include facilities to generate higher level, "upper-CASE" functions such as entity relationship diagrams and data-flow diagrams, application generators go directly from design to coding. Moreover, they generally do not support other CASE facilities such as standardized repositories for program elements. Therefore, they are less useful for large programming projects that require ongoing maintenance and revision. However, users are quick to note that their strength is rapid prototyping and turnaround of applications.

"You see the application backlog and the ongoing set of requirements from customers who can't wait two years or longer" to complete a project, said David Holliday, a principal at Lifecycle Systems, a Bellevue, Wash., software engineering consultancy. Holliday said he has been "getting the customer involved" using Knowledgepro. By using it interactively to design screens and program functions with users of the final application, Holli-

day said, he can shorten the development cycle. "Getting prototypes is the best way" to increase application turnaround, he said. And, since application generators create code directly from these prototypes, there is no need for programmers to recreate screens through hand-coding.

Other developers have explicitly

APPPLICATION generators combine prototyping, designing, and coding into a single step of the development life cycle.

chosen application generators after studying the available CASE alternatives. CASE workbench solutions make it "fairly easy to get boxed in," said Steven Cooper, a consultant at Atlantic Information Management, Inc. in Bridgewater, N.J. They are "expensive, and you become dependent upon a single vendor," he noted. "I prefer to be a little bit more mobile."

The new generators

Code generators for Microsoft Windows

CASE: W Caseworks

Atlanta, Ga.
Interface design tool for C and C++. Works with Microsoft's Foundation Classes and Borland's ObjectWindows class libraries.

KnowledgePro for Windows++ Knowledge Garden

Setauket, N.Y.
Interactive visual design tools and prototyping language generate C++ code. Optional tool kits for expert systems and math functions.

Windowmaker Professional 4.0 Blue Sky Software

La Jolla, Calif.
Visual interface builder with C and C++ code generation. Custom code is preserved during code regeneration. Help authoring tool included.

Protogen 3.0 Protoview Development

Dayton, N.J.
Interface builder generates C code for Microsoft's Foundation Classes and Borland's Object Windows Library.

CW Chart: Michael Siggins

4GLs expected to ride client/server wave

Capabilities of 4GL prototyping tools will make it future choice for developers, researcher says

BY GARY H. ANTHERS
CW STAFF

Developers of client/server applications are forsaking third-generation languages (3GL) such as Cobol and C in favor of supertools, according to a report from Forrester Research, Inc. in Cambridge, Mass. This new breed of fourth-generation languages (4GL) generates application code, builds graphical user interfaces (GUI) and connects to the major database management systems.

But users are befuddled by the fast-changing marketplace. "The tools share a common structure, but over three dozen variations were found... [and] pricing is chaotic: from \$300 to \$50,000," Forrester Research said.

According to Forrester Research, client/server power tools fall into three categories: • Assisted 3GLs, which work with standard programming languages but provide special tools for things such as building GUIs. • 4GL prototyping tools, which

allow rapid development of application shells to get early user feedback. Examples include PowerBuilder from Powersoft Corp. in Burlington, Mass., and SQLWindows from Gupta Technologies, Inc. in Menlo Park, Calif.

• High-level modeling tools, which apply the top-down approach of traditional computer-aided software engineering (CASE) to client/server development.

Forrester Research said most current offerings take the 4GL prototyping approach because 3GLs do not offer enough productivity and most users are not yet willing to make the investment needed for client/server modeling.

Codman & Shurtleff, Inc., a Randolph, Mass.-based maker of medical devices, is downsizing from a Wang Laboratories, Inc. VS environment to a Banyan Systems, Inc.-based local-area network with Oracle Corp. databases. The company, a division of Johnson & Johnson, is using PowerBuilder to develop appli-

cations for inventory control, product compliance, repair and credit returns.

According to Alan Harrington, senior systems analyst, PowerBuilder has reshaped the jobs of former Cobol programmers and boosted application de-

velopment productivity two to three times.

"We used to follow the data processing tradition — talk to users and find out what they want, go off and write all sorts of code and then send the results back," Harrington explained. "Now we do quick prototypes of screens and tables with the user sitting right there. The developer does everything from design to documentation."

Forrester Research said the following trends are shaping the market for client/server application development tools:

• Client/server development projects, typically for decision-support applications, are showing good results in many large companies, leading them to consider the more demanding transaction-processing applications. Vendors are beefing up their tools to handle those.

• Users are demanding GUIs, causing vendors

to upgrade the older, character-based tools.

• Recognizing that users will scatter their data over different database and hardware environments but will balk at learning a new tool for each configuration, the major vendors of database software are enhancing their tools to support competitors' databases.

• A market shakeout and user resistance to today's hefty price tags will bring peak prices for the development tools to between \$5,000 and \$8,000 for a single-person development license.

As products evolve, prices will fall while ease of use improves, the research firm said.

Donald Weimann, a PowerBuilder user and staff systems analyst at Chevron Information Technology Co. in San Ramon, Calif., agreed with a Forrester Research prediction that the 4GL prototyping and modeling classes of development tools will merge, or at least become better integrated. For example, he suggested that CASE models should pass information to a 4GL tool, with results of prototypes then passed back to update the model.

Weimann said he did some early work with assisted 3GL tools but was not pleased, particularly when building applications with complex GUIs.

Growing pains

Market expansion of client/server power tools should result in a shakeout of 4GLs and lower prices for users

	1992	1995
	Few	Broad
Database support		
Pricing	From \$300 to \$50,000	From \$5,000 to \$8,000
Number of major vendors	25	10
Total market size	\$475 million (worldwide)	\$2.6 billion
Product complexity	High/medium	Low
Distribution channels	Direct	Direct, plus broad use of indirect channels

Source: Forrester Research, Inc.

Graphical tools roll out at conference

New development tools to aid editing, graphics

BY PAUL GILLIN
CW STAFF

Two application development products were announced at the recent Windows & OS/2 Conference in Boston:

- The Stirling Group in Schaumburg, Ill., has figured out a way to in effect reverse-engineer compiled applications and lift out the graphical elements.

ResourceShield for IBM's OS/2 and Microsoft Corp.'s Windows works directly with the .EXE files on a personal computer, allowing developers to pull out items such as buttons, scroll bars, dialog boxes and menus, modify them and relink them to the application without ever working with source code.

It does that by using the resource table within each .EXE file, according to Viresh Bhatia, a Stirling Group co-founder. That table lists the location and content of visual resources within a program.

Users select an element by clicking on it, edit its contents

and reinsert it in the file or cut and paste to another program. The product is especially useful for translating applications into other languages, Bhatia said.

The Windows version of ResourceShield costs \$149; the OS/2 version is \$295.

- Lifeboat Software in Shrewsbury, N.J., said it will publish ED, The Programmer's Editor. ED is a developer's editor for the MS-DOS and Windows environments. It supports most popular programming languages.

ED provides programmer-friendly features such as automatic code indenting, hypertext lookups, keyboard remapping, versioning and journaling. It has an unlimited Undo feature, which allows the user to specify how many previous editing steps may be undone.

The editor can accommodate very large files and keeps extensive historical information so that programmers can recall files and commands through a mouse click.

ED is priced at \$269.

Windows viewing a free choice

Symantec tool allows Windows users to view code in any environment

BY GARRY RAY
CW STAFF

CUPERTINO, Calif. — With this week's scheduled release of Symantec Corp.'s Multiscopes Debuggers for Windows 2.0, Windows mavens can now view program code in Microsoft Corp.'s Windows graphical operating environment.

The debuggers, which Symantec said are the first to fully exploit the Windows environment, work with code created by Borland International, Inc.'s Borland C++, Microsoft's C/C++ 7.0 and a variety of other C and Pascal compilers. Support is also provided for assembly language programs.

According to company officials, the debuggers have been upgraded to work with C++ programs.

New features

Among the features added to support C++ code are expandable and collapsible class hierarchy browsers, object browsing, automatic object mapping, object-oriented breakpoints, C++ expression evaluation and browsing of member pointers.

Multiscopes's Crash Analyzer System, also included with the package, has two components: a monitor and execution dump utility (MED) and the crash analyzer debugger.

When a program bug causes a protection error, the MED utility captures the internal state of the machine to a disk-based dump file. Programmers can then use the crash analyzer de-

bugger to examine the dump file and determine the state of the application prior to the crash.

Symantec officials said the utility is available for licensing and distribution to beta-test sites and other preliminary users of a program.

Available immediately, the \$379 Multiscopes Debuggers package will be offered for \$99 until Sept. 30.



Multiscopes Debuggers for Windows lets users view program code in the environment of their choice

NEW PRODUCTS

Application development tools

American InterFace Computer, Inc. has created Plasma, a knowledge-based tool for Cobol re-engineering.

Plasma recognizes code; the product first scans the code, creating a knowledge base that consists of program information. Next, users explore the application in a variety of ways as cross-reference lists, data and control flow are analyzed. Plasma is typically configured on a Unix workstation linked to mainframes through Transmission Control Protocol/Internet Protocol.

Plasma license fees start at \$15,000.

American InterFace Computer
Suite 200
1 Westlake Plaza
1705 Capital of Texas
Highway South
Austin, Texas 78746
(512) 327-5344

Microstar Laboratories has introduced a tool kit that allows Microsoft Corp.'s Windows applications to communicate with a Data Acquisition Processor. The Microstar Laboratories Windows Toolkit has a Dynamic Link Library (DLL) of functions that are used for communicating with

the processor.

Any Windows programming language or Windows application that has the capability to call DLL can be used with the functions. The product produces a real-time data acquisition application when it is combined with Microsoft's Visual Basic.

Microstar Laboratories' Windows Toolkit costs \$95.
Microstar Laboratories
2265 116th Ave. N.E.
Bellevue, Wash. 98004
(206) 453-2345

Business Computer Design has announced Release 3.30 of ProGen Plus, a middle-CASE application generator for the IBM Application System/400 or System/38.

Enhancements in Release 3.30 include dynamically generated program contexts for flat panels and a new creation command that provides compatibility with other software products.

The product can work with the user's new or existing database files. It can create pop-up windows and has a flexible screen painter.

Prices start at \$4,500.
Business Computer Design
950 York Road
Hinsdale, Ill. 60521
(708) 986-0800

Lenel Systems International, Inc. has introduced MediaDeve-

loper, a universal multimedia engine designed for Microsoft Corp.'s Windows application development.

The product is a library of multimedia programming objects that permit users to add multimedia capabilities to existing applications or develop stand-alone or networked multimedia applications.

MediaDeveloper prices start at \$595.

Lenel Systems International
19 Tobey Village Office
Park
Pittsford, N.Y. 14534
(716) 248-9720

Compuware Corp. has released CICS Abend-Aid 5.2 and CICS Radar 4.0.

CICS Abend-Aid is an abend analyzer. The product was designed to provide analysis of CICS transaction abends and recommend corrective action. Release 5.2 offers support for DB2 Version 2.3 and for viewing any source-code program listing that has fast-path navigational capabilities.

CICS Radar 4.0 assists users in identifying the reasons for CICS region failures. The product has a diagnostic summary, provides program change information and executes storage error analysis.

Both products operate under MVS/XA and MVS/ESA and are available for a total cost of

\$30,000.

Compuware
31440 Northwestern
Highway
Farmington Hills, Mich.
48333
(313) 737-7300

Virtual Technologies, Inc. has introduced Sentinel.

The product is a debugging environment for Unix. With the use of dynamic memory, Sentinel helps users locate and resolve hidden bugs. It also traps memory errors.

The product determines the cause of memory leaks by offering users the tools needed to track down and figure out hard-to-detect memory leaks. Sentinel supports a variety of environments, including some from Sun Microsystems, Inc., Hewlett-Packard Co. and Intel Corp.

Prices range from \$195 to \$495.

Virtual Technologies
Suite 160
46030 Manekin Plaza
Sterling, Va. 22170
(703) 430-9247

Code libraries

Pocket Soft, Inc. has introduced VMDData, a suite of memory management libraries.

According to the company, the product provides a uniform, cross-platform method of managing a program's dynamically allocated data. It eliminates DOS

memory restrictions and allows one operating system to port applications to another system.

VMDData libraries are for C and C++ languages and cost \$495 for the first platform and \$295 for each subsequent platform.

Pocket Soft
Suite 195
7676 Hillmont St.
Houston, Texas 77040
(713) 460-5600

Compilers

EuroSoft, Inc. has released two DOS compilers from Salford Software Ltd. (UK).

The products are the Salford C/386, an ANSI C compiler, and the Pascal/386, an extended mode compiler.

The products reduce development time by compiling and linking at up to twice the speed of the nearest competitor. Address space is available for up to 2G bytes of extended memory with the DBOS DOS extender.

Salford C/386 programs can call subprograms written in Pascal and Fortran and vice versa, and both compilers offer application libraries with more than 200 routines.

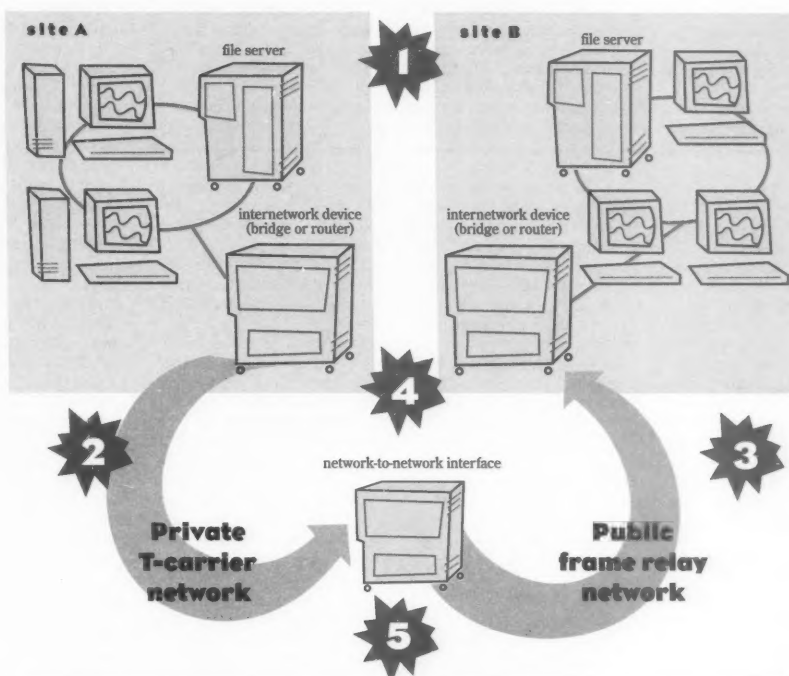
The C/386 compiler costs \$1,195; the Pascal/386 compiler costs \$795.

EuroSoft
8312 La Plata Loop
Austin, Texas 78737
(512) 288-3444

PRODUCT SPOTLIGHT

The latest in frame relay

Most implementors are experimenting with frame relay or are planning to use it in combination with faster methods in the future



● The typical frame relay network connects LANs to one another or to a central data processing system. Most people will combine existing T1 networks (augmented with a frame relay interface) with carrier-provided services. Properly planned, installed and tuned, frame relay promises to cut costs by 50% or more and increase performance. But without proper support, frame relay networks can cause significant internal traffic delays and even discard data, resulting in even longer delays for error recovery. A little attention to the "hot spots" of frame relay can pay a big dividend later, when the network is operating (see story next page).

Hot spots

1. Do you have end-to-end protocol compatibility with frame relay service characteristics?
2. Which private equipment will you choose?
3. Which carrier is best for you?
4. Do you go private or public?
5. What are the issues involved in hybrid networking and internetworking?

BY JILL HUNTINGTON-LEE

Frame relay is the answer. Frame relay will never fly. Generalizations like these really have people wondering just what the future holds for cost-effective, fast transmission of local-area network data over wide-area networks.

Frame relay was never intended to be a miracle technology. It is simply an interface to the first fast-packet switching service tailored for the up and down volumes and variable

lengths inherent in LAN transmissions. It doesn't stop for unnecessary error-checking pit-stops, so it's faster than its cousin technology, X.25. And it gives you full-time access to maximum bandwidth without making you pay for what you don't use, so it's cheaper than T1.

In theory, it's a good way to connect five or more geographically dispersed LANs running midspeed applications such as file transfer, electronic mail and terminal connections.

In reality, there are some imperfections, which explains the low number of implementors (there are only about 40) so far. As it turns out, this technology involves a lot more than just

passing packets of data (or frames). There are unsolved problems with managing network congestion, and there aren't enough access points, especially overseas.

You also can't run high-end applications such as graphics, teleconferencing, full-motion video, document imaging, Fiber Distributed Data Interface LANs or database-intensive client/server software.

Users have discovered that it's not easy to re-engineer private networks to support frame relay, as this could require investments in training or changing the network infrastructure, not to mention that faster options are just over the horizon in the form of Asynchronous

Transfer Mode (ATM) and Switched Multimegabit Data Service (SMDS). Although frame relay can be used as a stepping-stone to those technologies, the structure is not entirely in place to do that either.

But because of what frame relay does offer, there are people getting their feet wet by keeping their private T1 lines intact and experimenting with public frame relay services as they bring new LANs onto the network. That way, they avoid large capital outlays for switches and other equipment required to build a private frame relay network (see story page 91), not to mention some of the network management headaches and training

Continued on page 91

Huntington-Lee is an analyst at consulting firm Brandywine Network Associates in Delran, N.J.

The most important technological difference among the carriers is the switching technology used: cell switching or frame switching.

Cell-switched networks break frames into fragments before transporting them. This helps avoid a major component of network delay, called either serialization or assembly delay, which occurs when messages must be assembled character by character within each node before being transported to the next. Breaking a frame into fragments lets a node forward each piece faster because it takes less time to assemble the short fragment.

The problem with cell switching is that a critical portion of the standard, called the DE (Discard Eligible) bit, may be difficult to implement. The network sets the DE bit on incoming frames that exceed the throughput rate negotiated with the network. If congestion occurs, the network is supposed to discard these frames first, penalizing users who exceed their negotiated rate rather than those who are obeying the rules. If the DE bit is not set, a network might just as easily discard a frame associated with a well-behaved user. This is sometimes called the "fairness issue."

Only full frame switches can really discard frames based on DE (see chart page 91).

A second big concern is cost. Service costs are normally based on the average throughput required for each virtual connection be-

Which carrier?



tween user locations — called the committed information rate, or CIR. You're also charged a premium for virtual circuits that are over a given maximum mileage and local access charges.

Local access charges account for as much as half of your total service costs. You might want to review the locations of each frame relay carrier node with respect to your site locations to minimize access costs, especially if you're in a more remote location.

CIR charges can also make a major difference in network costs, not so much because of major rate differences but because carriers vary in the increments in which they offer it. A carrier that assesses CIR charges in units of 64K bit/sec. might force a user to buy considerably more capacity than needed for an application, particularly a modest one. One that sells capacity in smaller increments may be a better buy because the capacity can be matched more exactly to application need.

Virtual circuit distance premiums are not normally a major problem. Most carriers assess a surcharge on circuits more than 1,500 to 1,800 miles in length, but the charge can sometimes be avoided by routing traffic to distant sites through an intermediary location. A few sites with a surcharge will not usually make a major impact on network costs in any case, so most users have elected to simply pay the surcharge when needed.

Protocol compatibility



A big problem on frame relay networks is that — because they don't assign a fixed amount of resources to network conversations — they can easily become congested. At best, this slows message travel time. At worst, it increases the risk that information will be discarded to relieve serious congestion.

There's no way to avoid the problem of data loss if the network is seriously overloaded. The trick is to avoid congestion altogether, which, ironically, the frame relay protocol was designed, in part, to do. In fact, it is the first congestion-avoidance protocol.

Frame relay generates explicit congestion notifications in both the forward direction (FECN) of data flow and the reverse direction (backward, or BECN). These notifications, which take the form of bit settings in the frame relay header, are presented to the device that directly attaches to the frame relay network. They ask that device to "throttle back" on data flow before the network begins to accumulate excess information.

The trouble is, the device is normally a bridge or router, not the user who is actually the source of the traffic. That user is connected to a LAN, possibly several internetwork "hops" away from the interface. So the indicators basically get ignored; there's nothing else that can be done with them for the present.

Because today's LAN protocols don't directly use frame relay congestion notifications, users must "trick" them, either by adjusting their flow control limits or by selecting products or carriers that will forgive traffic overloads more than the standards require. In either case, performance is slowed in exchange for safe arrival of data.

Some protocols have better flow control than others. Transmission Control Protocol/Internet Protocol and Open Systems Interconnect can provide efficient transmission even when network delays rise. Additionally, Novell, Inc.'s recent enhancements to SPX/IPX improve its performance in typical frame relay internets. IBM's Systems Network Architecture is probably the strongest protocol for use with frame relay.

If you can't control information flows satisfactorily, you may have to do some form of in-network buffering to absorb congestion or overload without dropping data. Equipment vendors and carriers vary in their ability to do this; you should ask about buffer size and whether cell- or frame-based switching is employed (see #3).

Most people who consider frame relay won't have a private network linking all of their potential frame relay sites. You'll likely need to extend that network through public carrier facilities so that "fringe" locations can be connected as well.

In some cases, you might also want to link private frame relay networks from different vendors or even link two public frame relay carriers. The most trouble-free way to create a hybrid frame relay network is to use an internetworking device such as a router to connect the networks.

If a public and a private network are both connected to ports on a bridge or router, the device can direct traffic between the two networks without involving the user in any special internetworking issues. This same strategy can be used to "hybridize" frame relay with another type of data service.

If a public network is used to extend the coverage of a private frame relay network to reach a few remote locations, there may be no need to place a router or bridge at the public/private boundary. In this case, the user may want to simply link the two

frame relay networks together. This can be done either by connecting the user/network interfaces (UNI) offered by the public and private networks or through another type of frame relay interface called a network/network interface.

The value of the network/network interface is its support for the management of the whole connection. With the UNI strategy, each network believes the other to be an end user. A user on one network would have management visibility in his own network but not through it to the other user. This might result in a "half-connection," where one connection is broken but the fault is invisible to users on the other.

The network/network interface will ultimately be the standard for interconnecting frame relay networks, public or private, with each other, but the standard has only recently been submitted for voting to members of the ATM Forum; implementations will probably not be available before the end of 1992 or early 1993. In the interim, direct frame relay network interconnection, without an intermediate router or other internetworking device, should be avoided.

Hybrid concerns



Which equipment?



Most private frame relay users will base their networks on high-capacity digital services such as T1. In many cases, they will already have T1 backbone networks or circuits in place and will be hoping to exploit this low-cost bandwidth further with frame relay.

Private frame relay switches are available in two forms: T1 multiplexers supplemented with a frame relay interface and stand-alone frame relay multiplexers.

Integrated T1 multiplexers reduce the number of hardware elements and thus network complexity. Some can move capacity back and forth between traffic types as demand changes.

T1 multiplexers can also support more traditional

voice and data interfaces. They are best for applications for which the user has either no existing private network commitment or where the existing network is based on T1 products that offer a frame relay interface option.

Alternatively, stand-alone frame relay multiplexers can be used with an existing private T1 network. They are best used when the application is going to use an existing backbone network, particularly if that backbone is supported on a variety of equipment. A stand-alone device can be attached to a V.35 or RS-449 data port on any T1 multiplexer and can be assigned any portion of the T1 trunk capacity.

Like public services, private frame relay equipment

can use either cell- or frame-based switching. Some products switch complete user frames within the network, while others fragment the frames into smaller cells for transmission. When the private network has many nodes, cell-based is likely preferable. That's because fragmenting frames reduces delay more when more nodes must be negotiated between source and destination. Frame-based may be preferable when the application is more point to point.

Combining frame- and cell-based products on a single network may be more difficult because of differences in the way the networks manage congestion and discarding. Special care should be taken where a carrier service based on one strategy is matched with a private network based on the other.

Public? Private?



This debate should sound familiar to anyone who's even dabbled in communications services. In frame relay, the decision is generally based on cost.

If you have large concentrations of traffic, private networking is generally less expensive. If you have already been able to justify private T1 and T3, you should probably at least consider private frame relay.

If you don't have a backbone network in place, you may still be able to justify private frame relay if you have large traffic flows between sites.

Most users probably overlook a major private frame relay application: Two locations with two or more data connections with unlike protocols can often save money by using frame relay to combine these onto a single channel. The use of a computer-to-computer trunk is usually low enough that two data connections of a given speed can be combined on a single circuit of the same capacity, cutting costs by 50%.

Public frame relay services are usually best where there are no major concentrations of traffic and where total site-to-site traffic volumes are well below T1 levels. Public is also best, generally, when there are more than just two or three sites.

A final factor to consider is support and management. A user with no network management experience whatsoever may find frame relay's traffic management demands too much to handle and might be better off dealing with a public carrier.

Articles written by Thomas Nolle, president of CIMI Corp. in Voorhes, N.J.

Informix Database Technology Helps World Vision Reach The Children.



When World Vision, a non-profit international Christian relief and development agency, needed to manage \$225 million annually in fundraising and distribution, they turned to us, Informix, the experts in UNIX® relational database management systems.

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Underlying technologies:

Cell relay: A general term for any switching technology that uses fixed-length cells, such as IEEE 802.6/SMDS or ATM and B-ISDN (see below).

Fast-packet switching: Describes the new generation of post-X.25 packet switching technologies. There are three types: frame relay, cell relay and vendor-proprietary fast-packet switching.

Standards:

ATM: Asynchronous Transfer Mode, one of two transfer modes defined under Sonet (see glossary entry). Specifies fixed-length cells as opposed to the variable-length frames of frame relay. Supports 45M bit/sec. and up, as opposed to 56K/64K to 1.544K bytes with frame relay. Will be the basis for future B-ISDN services. Unlike SMDS (see entry), ATM is considered

Glossary

a wide-area network technology and is promoted by the interexchange carriers and international switch vendors. It is not yet available.

DQDB: Distributed Queue Dual Bus is a cell-relay technology for metropolitan-area networks and is the basis for IEEE 802.6. SMDS and DQDB/IEEE 802.6 are promoted by the regional Bell operating companies (RBOC), whereas WAN switch vendors and interexchange carriers promote ATM.

Sonet: Synchronous Optical Network is an international standard for carriers' fiber networks and the foundation for B-ISDN. Supports speeds from 45M

bit/sec. to somewhere in the gigabit range. Defines two transfer modes: synchronous, or STM (for circuit switching), and asynchronous, or ATM (for cell relay).

IEEE 802.6: A standard addressing cell relay transmission in MANs and the basis for SMDS. Supported by the RBOCs.

Services:

B-ISDN: Broadband Integrated Services Digital Network. An ATM-based service with international support. Not yet available.

SMDS: Switched Multimegabit Data Service. A service based on the IEEE 802.6 cell relay standard. Faster than frame relay. Uses fixed-length cells, but as it targets MANs, it is not identical to ATM-based services such as B-ISDN for WANs. Now in beta testing.

Frame relay services

Vendor	Start date	Switch	Access points	Service range	Access speed (bit/sec)	CIRs (bit/sec)	Over-subscription	Network design	Network management	CPE
AT&T (800) 247-1212, Ext. 621 AT&T InterSpan Frame Relay Service	June 1992	Stratcom IPX	150+ U.S.	National, Europe	In the US: 56K, 64K, 128K, 256K, 384K, 512K, 768K, 1.024M, 1.544M; in Europe: 64K, 128K, 256K, 2.045M	32K, 48K, 64K, 128K, 256K, 384K, 512K, 768K, 1.024M	Burst only	AT&T InterSpan sales support specialists, Bell Labs technical support	AT&T InterSpan Frame Relay Customer Network Management Services	Customer premises router, DCE, dial-up modem through AT&T InterSpan Frame Relay Extended Connectivity Option
BT North America, Inc. (800) 872-7654 ExpressLane	September 1991	Stratcom IPX, BT's Turbo Engine	22 U.S., 5 UK, Europe	National, Europe, Japan/Far East	56K/64K	56K/64K	NP	Yes	Concert	ACC, Cisco, Wellfleet
CompuServe, Inc. (614) 451-8600 Frame-Net	October 1991	Stratcom IPX	38 LATAs	National	56K- 1.024K at 128K increments	4K-512K in 4K increments	Up to 200%	Sales support, product marketing and technical engineering support staffs	Based on Stratcom's Strataview network management platform	Routers (optional), CSUs, DSUs
Infonet Services Corp. (310) 335-2600 InfoLAN Frame Relay	In beta testing	NET	11 U.S., Europe	National, Canada, Europe	64K, T1/E1	64K	Burst only	Enterprise Defined Network Services	INMC client workstation	Routers, DSUs
MCI Communications Corp. (703) 506-6060 VPDS Frame Relay	June 1992	Siemens	300+ U.S.	National	56K/64K, 112K/ 128K, 224K/256K, 336K/384K, 512K/728K, 768K/1.024M, 1.344M, 1.536M	16K, 32K, 48K, up to 1.024M at increments of 56K and 64K	200% of access	MCI provided capability	MCI provided capability (SNMP- based)	Routers, CSUs, DSUs
Nynex New York & New England Telephone (914) 644-5470 New York Frame Relay New England Frame Relay	April 1992 (New York) Planned October 1992 (New England)	Northern Telecom, Link Peripheral Processor (LPP) Data Span	16 New York, 15 New England	National, Canada/Mexico, Europe	56K, T1 (1.344M or 1.536M)	56K, T1	56K, T1	By the respective account team	SNMP planned for 1993	None planned for 1993
Pacific Bell Contact local rep. Pacific Bell Frame Relay Service	First half 1993	To be announced	4 U.S.	Regional only (IntraLATA)	56K/64K 128K, 384K, 1.544M	To be announced	To be announced	Assigned systems design consultants	To be announced	To be announced
Sprint Corp. (800) 736-1130 Sprint Frame Relay Service	December 1991	Sprint TP4900	300+ U.S.	National	50K/64K, fractional T1, T1	56K/64K, fractional T1 up to 1.024M	Yes (ingress) No (egress)	Yes	Yes	Yes
US West (303) 965-8973 Frame Relay Service	March 1992 Full installation across region Q1 1993	AT&T Network Services BNS 2000 Datakit II	Metrowide	IntraLATA in US West's 14-state region	56K, 1.5M	First-quarter 1991 support	NP	Via data application consultants	None	Bridges/Routers CSUs, DSUs
Wiltel (918) 588-3210 WiltPak	March 1991	Stratcom IPX	16 U.S.	National	56K/64K, 256K, 384K, 512K, 768K, 1.024M, 1.536M	Nx64	200%	None	None	Routers, CSUs, DSUs

Do-it-yourself guide to frame relay

Building your own frame relay network is much more complicated than signing on with a carrier. But it may be the only way to obtain the access, performance and control over your network that your company seeks. Here's a quick guide to implementation alternatives.

Access equipment

The access device turns LAN data into frames by attaching all the necessary headers and trailers. Routers are the most common. Virtually all router vendors now provide frame relay support.

There are several alternatives to routers, such as PC-based software and plug-in cards. These packages depend on the power of the platform PC and typically don't provide the throughput or added features of a conventional router.

Another form of access equipment, called stand-alone frame relay access devices, typically encapsulate synchronous protocols such as IBM's SNA into frames for transport.

Finally, there are frame relay concentra-

tors that support more than one port-to-network connection. **Sync Research, Inc.** in Irvine, Calif., is a leading supplier of these SNA-capable concentrators.

Switching equipment

Switches accept frames from a number of access devices and forward the data to the destination. They differ according to their

technological ancestry.

- **Upgraded X.25 switches.** These have the benefit of added flow-control mechanisms. Two frame relay switches with an X.25 heritage include **BT/Tymnet Turbo Engine** from San Jose, Calif.-based **BT North America, Inc.** and **TP4900** from Reston, Va.-based **Sprint Corp.**

- **Cell-relay switches.** Vendors of cell-relay switches claim they'll be able to convert easily to ATM when the time comes. These products include **IPX** from **Stratacom, Inc.** in Campbell, Calif., and **FRSU** from **Siemens/Stromberg-Carlson** in Boca Raton, Fla.

- **Upgraded multiplexers.** Multiplexer vendors hope to ease the customer's transition from private lines by overlaying frame relay on top of the multiplexer-based network. Multiplexer-based products include the **Frame Relay Exchange** from **Network Equipment Technologies, Inc.** in Redwood City, Calif.

- **Frame relay-only switches.** Manufacturers that have built their equipment from the ground up to support frame relay can obviously boast that their designs are the most frame relay-specific. **Costa Mesa, Calif.-based Frame Relay Technologies, Inc.'s** **FrameMux 1200** and the **#11SS** from **Netric Corp.** in Herndon, Va., fall into this category.

JILL HUNTINGTON-LEE

Cell vs. frame

The cell vs. frame debate is also called 'the fairness issue'

Cell-based switches and service providers:

AT&T BNS-2000
CompuServe, Inc.
Stratacom, Inc.'s IPX
Siemens/Nixdorf Information Systems, Inc.'s QPSX
WiTel

Evolving to cell:

BT North America, Inc.
MCI Communications Corp.

Frame-based switches and service providers:

Sprint Corp.
Network Equipment Technologies, Inc.
Smaller regional providers

Source: CIMA Corp.

Latest in frame relay

CONTINUED FROM PAGE 87

costs. Frame relay services can also help users migrate to router-based LANs and establish an infrastructure that will sustain higher speed cell relay-based networks such as ATM.

Even for experimenters, there is a catch: Many LANs today are departmental creations that have grown spontaneously, without centralized information systems supervision. Before including LANs in an experimental frame relay subnet, a corporation must have an effective, internal central point of contact for ordering and implementing that service.

Naysayers and enthusiasts aside, it's impossible to ignore the recent equipment enhancements as well as the new value-added service features that indicate a maturing market. **Stratacom, Inc.'s** **IPX Version 6.0** includes new software for tracking use, throughput, congestion and errors, including customizable reports. Carriers such as **CompuServe, Inc.** and **WiTel** that use the **IPX** will undoubtedly pass on the benefits of these capabilities to their subscribers.

The appearance of frame relay network design software also indicates that the market is shoring up. One such product from **Network Management, Inc.'s** **Network Analysis Center** in Syoset, N.Y., is **Mind Frame-Relay**, which can help users prepare to cost out different network configurations.

Also, the recent introductions of public frame relay services by the nation's two largest carriers — **MCI Communications Corp.** and **AT&T** — have put more muscle into the market and dramatically increased the availability and viability of the technology.

The tangled web of frame relay pricing

Frame relay's biggest plus is better connectivity at reduced cost. But when you attempt to spell out those costs in black and white, the "big plus" turns into a big nightmare.

With the exception of **AT&T**, **MCI Communications Corp.** and **WiTel**, all major vendors have made their fees public. Not that this helps much: Variations in pricing structures are so numerous and convoluted that users can spend days trying to price out a single network configuration for three or four vendor scenarios.

All pricing structures have two distance portions: access charges and circuit costs. But the similarities stop there. For both access and circuits, some schemes are distance-sensitive and others are not. Services may be fixed-rate or usage-based. All services carry onetime fees and monthly charges, but some include unique surcharges, while others have discounts. All services have options, which may include customer access to network management features, reports, network design services and comprehensive equipment leasing arrangements.

Faced with all of these variations, the user's best bet is to simply approach a carrier and ask for a price on a specific network configuration and then compare this to prices of other carriers.

Don't underestimate the power of bargaining. Vendors are definitely responsive if they know you're willing to move on to someone else if your demands aren't met, says **Terry Lowder**, vice president of the **Advanced Technology Group** at **Banc One Services Corp.** in Columbus, Ohio.

Now

Public frame relay fits like a glove on **Byer California**, a nationwide women's clothing manufacturer. The San Francisco-based firm uses **BT North America, Inc.'s** **ExpressLane** service to tie together its remote Ethernet LANs at regional showrooms scattered across the country.

Byer California uses frame relay to transmit reports and connect terminals providing immediate information on new garment lines to major retail customers, including **JC Penney Co.**

In 1988, the company began using **BT's** **X-link**, an **X.25** service, to link its remote LANs. Last year, the company began searching for a way to upgrade service to its showrooms without installing a private network. **BT's** ability to provide a turnkey frame relay solution was a big drawing card for **Byer**.

"Our business is shipping garments, not programming routers," explains **Michael Higgins**, technical support manager. **BT** provides routers, data service units/channel service units, the telecommunications interface and "everything up to my Ethernet cable," he says. **BT's** standard package includes equipment and support.

Not yet

At **Evangelical Health Systems** in Oak Brook, Ill., the sports car is in the garage, waiting until it can really fly. The company owns five frame relay-capable switches but is waiting to use them.

The reason, explains **Leonard Nielsen**, lead network consultant at the company, is that current technology does not allow LAN transmissions to travel at peak speeds at all times. Early frame relay enthusiasts expected to be able to send LAN data on unused bandwidth anytime it was available. In reality, congestion control mechanisms now on some frame relay switches allow only momentary bursts of data at T1 speeds before quickly throttling back to prevent congestion and possible data loss.

Vendors are now developing new algorithms for congestion control that may overcome this limitation. New switches are expected this fall that use a look-ahead algorithm that analyzes network congestion and passes on as much traffic as possible rather than arbitrarily throttling back after each momentary burst.

"If that works, frame relay will make a lot of sense," Nielsen says.

Unlikely, unless . . .

Sam Shuler, communications strategy manager at **Texas Instruments, Inc.**, has researched frame relay from top to bottom and has decided to wait. "On the surface, it appears to satisfy the demand for" reducing costs, **Shuler** says. But in his view, reducing monthly line costs is not always the true bottom line. "Let's say I save \$12,000 a month by going with frame relay. I can easily lose \$12,000 worth of business during 15 minutes of downtime — or spend \$12,000 on training costs to educate technical staff on frame relay."

Additionally, access is not yet ubiquitous. "If you're already a global operation, obtaining only point applicability within the total global network environment creates additional cost," he says.

Frame relay also can't increase the upper bounds of performance for private T1 users. "Frame relay doesn't scale exponentially," **Shuler** says. Because he knows he'd eventually have to move onto something faster, "my inclination is, why not go through one training mode instead of two?" he asks.

Yes, and . . .

For some people, frame relay is a stepping-stone. "We're going into frame relay expecting ATM to be the ultimate answer," says **Terry Lowder**, vice president of the **Advanced Technology Group** at **Banc One Services Corp.** in Columbus, Ohio.

Banc One is currently moving from a **Systems Network Architecture** network to a client/server environment based on **IBM's** **Advanced Peer-to-Peer Networking**. The shift will entail interconnecting LANs in an any-to-any configuration. "Today we have a **Timeplex**-based switched backbone tying together our T1 networks around the country," **Lowder** says. "By building in frame relay [to the multiplexers], we'll see better use of bandwidth and better performance for the permanent virtual circuits." ATM will kick in when the company gets into document imaging. "Serious deployment [of imaging] drives our bandwidth requirement," **Lowder** says.

In general, **Lowder** warns against investing in frame relay without considering the future. "If you're going into frame relay, you need to talk to the same vendor about ATM," he says.



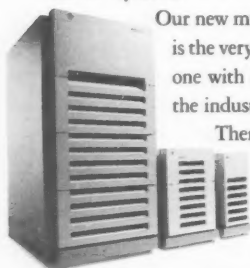
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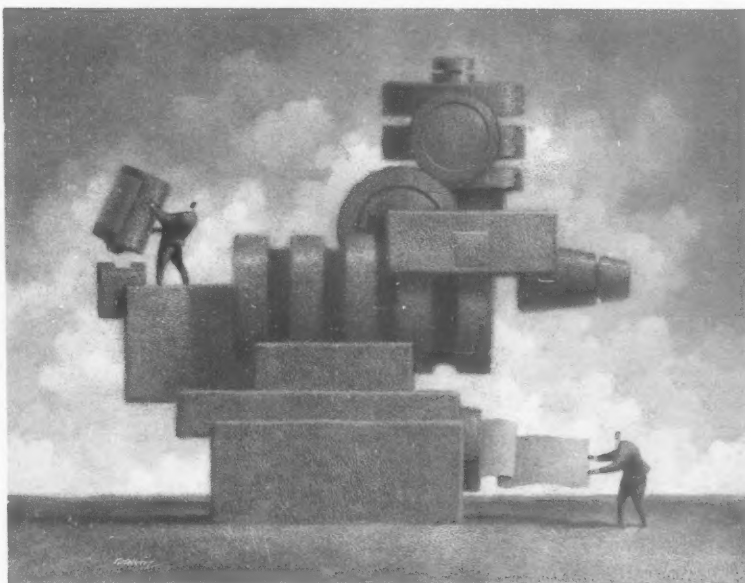
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IN DEPTH

OS/2: Quirks & fixes

Version 2.0 has much to recommend it, but there are some things you need to know before you try to install it in a mixed-vendor environment



Rob Colvin

BY FABIAN PASCAL

OS/2 2.0 has some great attributes and may, given its ability to multitask DOS Windows applications, be the most logical successor to DOS. At this point, however, getting OS/2 2.0 to work smoothly, particularly in a mixed-vendor environment, requires time, resources and more than rudimentary technical expertise.

While OS/2 should run on any IBM-compatible system and does run on many, it may balk at some configurations.

For example, I've been working with OS/2 2.0 in a stand-alone mode multitasking OS/2 and DOS sessions on non-IBM hardware (see

Pascal is a Washington, D.C.-based independent consultant, teacher and writer specializing in relational databases and SQL technology.

related story page 95).

During a period of about eight days, the OS/2 installation program failed at least 24 times, at different stages and with intermittently variable error messages, sometimes occurring in combination. Problems are still popping up after installation that have yet to be resolved.

That there are compatibility problems at this point is not surprising, given the difficulty of introducing a new, sophisticated operating system into a diversified and no longer standardized PC market.

What is important is that both IBM and third-party hardware suppliers work fast to resolve problems and that early adopters not be blindsided by complications.

After several months of working with my particular configuration, I've developed some knowledge of where problems can crop up, whether they can be avoided and — if they can — how to do it.

Advice: If you decide to use Extended Industry Standard Architecture (EISA), watch out for compatibility and support problems. Hard disk and video performance over a 32-bit data path is significantly faster than that of an AT compatible's 16-bit XT/AT bus, also known as Industry Standard Architecture.

If you want to ensure IBM compatibility and support, the 32-bit option is IBM's Micro Channel Architecture (MCA)-based Personal System/2. But some users, like myself, already have or prefer generic hardware. The 32-bit non-IBM alternative to MCA is the EISA bus.

I assembled my system from components, which was a risky option because many EISA system board makers (such as Micronics Computers, Inc., the maker of my 486/33 board) do not license OS/2. I'm also dependent on components vendors and IBM working together to solve any issues that crop up.

EISA's primary advantage is its backward compatibility with older AT cards such as memory extension, hard disk, video and Bernoulli box adapters, which IBM's MCA does not support.

While such XT/AT cards do not take advantage of the full EISA bus potential, such compatibility is important because EISA-specific equivalents have been slow to emerge and tend to be expensive.

But with OS/2, preserving old XT/AT cards may not always be possible. Even when it is, performance might not be acceptable. For example, OS/2 does not like some older, slower memory extension cards.

When my installation program kept crashing, it took me a lot of trial and error to identify the 8M-byte random-access memory card as one of the culprits. I had to replace the card (which cost \$1,000 about four years ago and costs about \$250 today) with faster system board memory, which cost about \$700.

Continued on page 94

- **Compatibility problems using EISA**
- **Device drivers are not all equal**
- **DOS sessions can produce surprises**

Continued from page 93

One way to avoid compatibility and support troubles is to consider buying an assembled EISA system.

The choice of components may be somewhat restricted, but some of them may come with a licensed, supported copy of OS/2 preinstalled.

Advice: Small Computer Systems Interface (SCSI) drivers distributed with OS/2 support only specific adapters.

There are alternatives, but proceed with caution. Given the size of OS/2 system and application files, disks are not a viable option for handling the frequent recommended backups. While a large hard disk with a dedicated backup partition will work, it is safer to use a different physical drive. Either tape drives or faster cartridge drives, such as a Bernoulli box, offer the advantage of "infinite" storage for multiple backups (particularly useful for database management).

For that reason, SCSI adapters can handle up to seven storage devices and are a good option for OS/2.

In theory, SCSI was devised to standardize the interface to storage devices. This should mean that through SCSI, OS/2's built-in support will work with any compliant adapter.

In reality, vendor implementations vary, and consequently, the SCSI drivers currently distributed with OS/2 officially support only IBM, Adaptec, Inc. and Fu-

ture Domain Corp. adapters. If you have or want another adapter (particularly one that takes specific advantage of the EISA bus), you will need to depend on its manufacturer for OS/2 support.

A generic driver that also comes with OS/2 allows certain other SCSI adapters to work, but it does not take advantage of any of the special features they may provide, such as EISA-specific performance.

If you intend to use removable drives and select a SCSI adapter, not only make sure it supports such drives under OS/2 but also find out which of two available options the adapter-maker has chosen to implement its support: exploiting IBM's built-in OS/2 support for SCSI or developing add-on drivers.

Companies exploit the SCSI support built into OS/2 with a base device driver written to IBM specifications. However, because OS/2 recognizes removable media such as Bernoulli cartridges as large floppies, this approach yields slow performance and causes data compatibility problems between DOS and OS/2.

For example, I have an EISA SmartCache Plus SCSI adapter from Distributed Processing Technology in Maitland, Fla., and a 44M-byte dual drive Bernoulli box from Iomega Corp. in Roy, Utah, for backups. Distributed Processing has recently released an OS/2-based device driver that recognizes Bernoulli cartridges as floppies. Because floppies are not partitioned, OS/2-written data is not visible to DOS and vice versa. This means I can't read OS/2 data in DOS or DOS-written cartridges in a DOS session under OS/2.

Certain vendors' alternative to base device drivers is to develop add-on drivers that in essence recognize removable drives as "removable hard disks." Iomega, for example, has released a driver for the Bernoulli box that supports cartridge partitioning and compatibility between DOS and OS/2 data. However, it works only with Iomega's own proprietary adapter, which is XT/AT, and occupies an additional system slot.

At this point, neither of the two options allows bootability from removable media. The next version of OS/2 may allow it by locking the drive, but this option defeats the idea of removable media. Add-on drivers will continue to offer removable drivers and data compatibility without bootability.

The best solution would be for OS/2 to support bootability as well as removable media and compatibility. However, because that's not how OS/2 was designed, you will have to compromise based on your needs and preferences.

Advice: There are limited options for optimal resolution on non-IBM platforms. The larger the monitor screen and the

higher the resolution of the video adapter, the more you will appreciate OS/2's graphical features. You can place more icons and windows on the screen, overlapping them for better viewing.

OS/2 comes with built-in standard Video Graphics Array (VGA) video mode that

most video adapters support automatically. But the VGA resolution of 640 by 480 pixels limits the number of icons and windows you can display simultaneously and handle effectively on a 14-in. monitor.

Unfortunately, there is no equivalent to the VGA standard at higher resolutions. Most vendors have their own proprietary modes, collectively called Super VGA, but few have made OS/2 drivers available. OS/2 comes with built-in support for IBM's Extended Graphics Array mode, with resolutions up to 1,280 by 1,024 pixels, and 8514/A mode, with resolutions up to 1,024 by 764 pixels. (The latter is recommended for 16-in. monitors.)

Extended Graphics Array mode is legally restricted to IBM adapters for PS/2 systems, while only one vendor, ATI Technologies, Inc., currently supports 8514/A mode. Therefore, the only options for non-IBM platforms are a VGA or an ATI 8514/A adapter.

Advice: Setting up a DOS primary partition on a hard disk may be necessary to avoid behavior problems. True DOS multi-

tasking is seen as one of the prime advantages of OS/2, which is made possible by a built-in version of DOS customized and optimized for OS/2.

But I found that in my setup, windowed DOS sessions were sometimes quirky. For example, my DOS windows, set to start as minimized desktop icons, behaved erratically; they were only partially painted and

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displayed garbage when I typed commands in them. (IBM has acknowledged a bug.)

Moreover, some older software may not run under the OS/2 version of DOS. It might be possible to work around this problem by setting up windowed sessions of regular DOS that OS/2 can multitask as well, but this setup can be temperamental.

For example, my DOS 5.0 windowed session would not load OS/2's Expanded Memory Manager driver.

Therefore, I couldn't load software drivers and resident programs into high memory to make more conventional memory available to programs. OS/2 issued an error message that warned of a conflict with an adapter, but the message did not specify which adapter or memory address was involved.

Other programs cannot run in windowed sessions because they "misbehave," (i.e., they access resources in a way that does not allow OS/2 to protect the system from crashes). This is true of programs such as Symantec/Peter Norton Computing Group's Speed Disk defragmentation utility, for instance.

My recommendation is to set up a DOS primary partition on the hard disk, from which you can boot DOS and perform tasks that are not possible otherwise. In this context, it is safer to stick with the old (but improved) File Allocation Table, or FAT, format for the OS/2 partition rather than going with OS/2's High Performance File System (HPFS).

Even though HPFS has the advantages of longer file names and better perfor-

My system components

Besides a 16-in. monitor, my system consisted of the following components:

- EISA 486/33 system board with 8M bytes of RAM from Micronics Computers in Fremont, Calif.
- Ultra Graphics 8514/A video adapter from ATI Technologies in Ontario, Canada.
- SmartCache Plus EISA SCSI adapter with 4M-byte cache on board from Distributed Processing Technology.
- Dual 44M-byte drive Bernoulli box from Iomega in Roy, Utah.

mance, it does not allow DOS and DOS applications to recognize and access the OS/2 partition.

Solving the problem

When I came across the various problems with my configuration, I went through the usual support channels to get them resolved. I made at least 10 calls to IBM, involving six people at several levels within the OS/2 support structure. The staff was very prompt in responding to problem reports and was eager to resolve any glitches. I also placed calls to my SCSI adapter

vendor, Distributed Processing Technology, and exchanged information on CompuServe, Inc.'s CompuServe IBMOS2 support forum.

Unfortunately, in many instances they could not figure out what was wrong. This was exacerbated by the lack of identical hardware configurations on which IBM can replicate problems. IBM's OEM laboratory tests numerous systems that may include my same components but not my exact configuration.

There was only sparse information in IBM's database of reported problems and IBM manuals, and OS/2 2.0 error messages weren't any help either.

In the end, I used trial and error to get to the bottom of things. For example, I figured out that my installation program was crashing because of my old memory board and SCSI adapter caching.

The fact remains that OS/2 2.0 may not be ripe enough yet for users with low technical expertise or ones who do not have the time and resources to dedicate to problem resolution.

What would it take to make OS/2 2.0 viable for a broader range of experience levels and environments? I have a few suggestions:

• **Add some finishing touches.** IBM must beef up basic diagnostics, such as memory testing, to identify unacceptable memory prior to installation. It must also move to user-friendly memory mapping and management to identify and help resolve conflicts as well as optimize operation and performance.

It should also make its error messages

more informative, indicating possible sources of problems and potential avenues for resolving them.

• **Improve generic hardware support.** There should be more drivers available for non-IBM components, particularly SCSI and high-resolution video adapters. There is no reason, for example, why Extended Graphics Array should not be available for non-IBM hardware, especially because it could make OS/2 more attractive to more users. The company should improve removable media support.

• **Personalize customer support.** Each caller should have one support person as a point of contact per problem. In this way, the user doesn't have to repeatedly describe his configuration and his problem.

The contact person should also act as a liaison between IBM and non-IBM technical personnel.

• **Revamp IBM's support database.** IBM invented relational technology. It should bring this knowledge to bear on its support database. There should be one record for each customer, one record for each problematic system reported and one record for each problem reported per system.

The company should standardize the basic configuration details needed for problem resolution, and it should record these details once for each system. This will save time on reporting and recording information for each problem. With solutions and fixes properly recorded in the same database, it should be easier to match them to problems using an appropriate database management system. •

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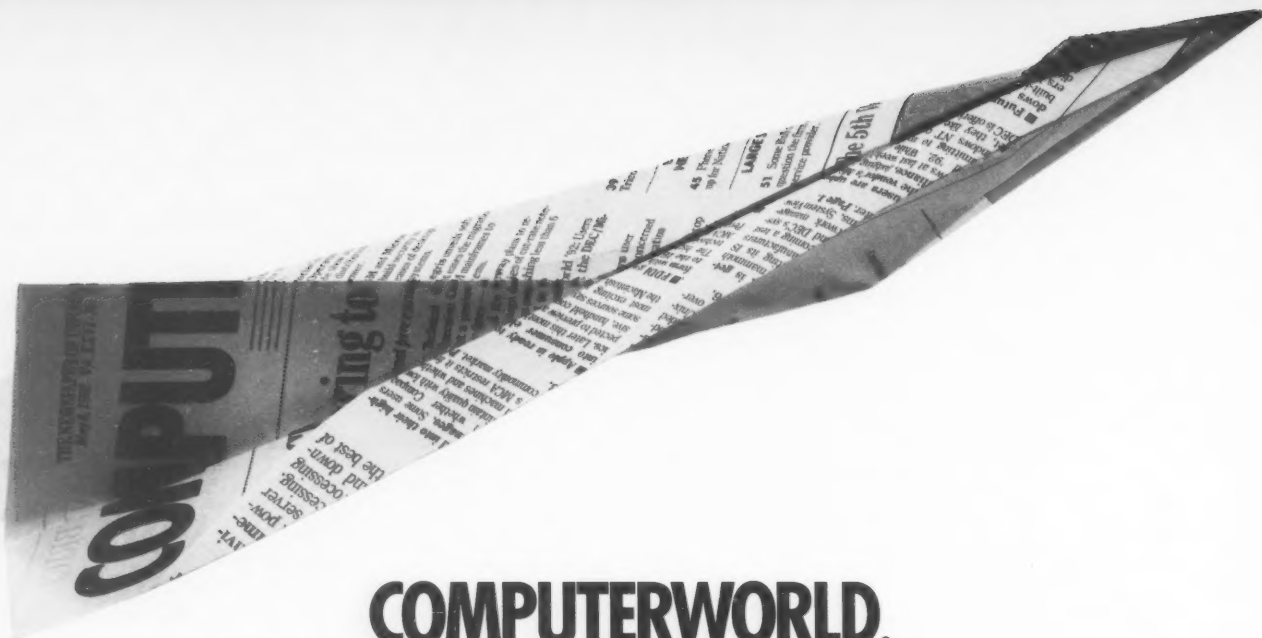
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8:12 a.m., Thursday. News Editor Alan Alper and Assistant News Editor Patricia Keefe meet at the Framingham home office to review the hottest news that's come in during the week from all over the world.

1:58 p.m. Stories continue to pour in. Alper meets with top editors and production people to map out the 12 late-breaking news pages. Art Director Nancy Kowal presents ideas for visuals that will bring the news stories to life.

6:09 p.m. Tokyo Correspondent Lori Valigfa receives a hot tip on a new technical advance in active matrix displays for PC's. She calls her sources in Japan to check out the rumor.

10:37 p.m. Alper, Keefe, and staff finish editing the final stories, clean up the pizza boxes, soda cans and shut down for the night.

8:02 a.m., Friday. The *Computerworld* staff filters into headquarters for the final push. Finished layouts must be at the printer by the end of day to make the deadline.

10:32 a.m. Maryfran Johnson, Senior Editor, transmits a story from the IBM Scientific Computing Conference in Palm Springs. IBM has announced the details of a major advance in RISC-based processing.

12:48 p.m. Midwest Bureau Chief Ellis Booker puts the finishing touches on a story about the first user of NCR's new parallel high-end processing system.

5:37 p.m. Electronic transmission of the latest news in IS is complete. The current issue of *Computerworld* is on its way to you.

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MANAGER'S JOURNAL

EXECUTIVE TRACK



Atlantic Container Line has promoted 18-year veteran **Jim Levis** to the position of terminal systems manager. Levis, whose previous posts include marine terminal and equipment control supervisor and systems integration manager, is now accountable for development and enhancement of information systems in the South Plainfield, N.J.-based company's terminal area.

As part of several late July management appointments, **Montgomery Ward & Co.** filled a 2-year-old vacancy in its IS department, naming **Joe Collins** vice president of operational planning and chief information officer. Collins, 42, had been a consultant in private practice; before that, he served as executive vice president and chief operating officer at New Jersey-based **Herman's Sporting Goods, Inc.** One of Collins' first duties will be to manage the Chicago-based retailer's recently announced development outsourcing contract with **Electronic Data Systems Corp.**

Late last month **Morteza A. Rahimi**, formerly vice president at Wayne State University in Detroit, was named vice president of IS and technology at **Northwestern University** in Evanston, Ill. Rahimi, 53, joined Wayne State in 1983 as its IS director.

Martin Bieber has joined **St. Francis Hospital Heart Center** in Roslyn, N.Y., as vice president and CIO. He comes to St. Francis from Beth Israel Medical Center in New York, where he served as vice president of IS.

Who's on the go?

When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Nell Margolis, Senior Editor, Management, **Computerworld**, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

What is re-engineering, anyway?

Companies define term as they redefine the way they do business

BY WILLIE SCHATZ
SPECIAL TO CW

GTE Telephone Operations knew it was not going to be business as usual.

Under a new regulatory scheme, the telephone industry was about to take on the task of dealing with 50 separate state public utility commissions, each with its own price cap to impose.

For GTE — which, as a regulated monopoly, had become accustomed to profit expectations that made scrimping a low priority, the prospect meant a radical reversal. "We knew if we didn't get our costs under control we wouldn't make money," said Blaine Maring, assistant vice president of information systems architecture at the Irving, Texas-based company.

And when GTE went to analyze its business process information, it found that it first had to create a way for such information to be tracked and assembled.

"We had to re-engineer our process

es and get to the core of our business," Maring explained. That meant examining every aspect of the company's telephone ordering process, from how it billed customers for service to whether its network could handle the increased traffic created by new customers.

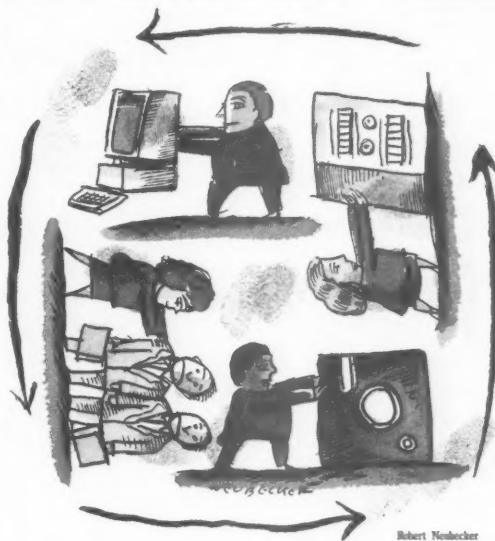
engineering? The answer depends on who you ask. Whether it's called re-engineering, total quality management or business process restructuring, firms across the U.S. are reevaluating how they do business — and how information technology can help them do it better — as they respond to increasing competitive pressures.

According to Michael Hammer, the IS consultant credited with putting "re-engineering" into the IS/business lexicon, that makes GTE Telephone the exception rather than the rule. Hammer, who is president of Cambridge, Mass.-based Hammer & Co., contended that most companies re-engineer under extreme circumstances — for example, when their competitors fill orders five times faster than they do.

So when a semiconductor firm, the name of which Hammer declined to reveal, found itself filling orders five times slower than its

archival and heard about the delays from its angry customers, it did a womb-to-tomb number on its order ful-

Continued on page 98



Robert Noddecker

The self-test also required analyzing the company's IS techniques and inventory.

But was GTE Telephone in fact re-

Humana cuts staff, rolls out IS services firm

BY NELL MARGOLIS
CW STAFF

LOUISVILLE, Ky. — Information systems staff members at Humana, Inc. got a firsthand glimpse of both the burdens and the benefits of corporate cost-cutting earlier this month when the health care giant took two different tacks to right its listing finances.

A 400-person administrative staff layoff, sparked by a drop in hospital and health plan revenue, will likely affect the IS work force, Humana spokesman Tom Noland said. Overall, the work force reduction will eliminate some 4% of Humana's Louisville-based positions, Noland said, garnering the company about \$11 million in savings. How hard a hit IS will take is as yet undetermined, he added.

At the same time, however — and toward the same overhead-cutting goal — Humana created three new service companies, one of which is an

IS spin-off, according to the company.

Effective Oct. 1, F. David Rollo, Humana's senior vice president of medical affairs, will head up an as-yet-unnamed company that will target hospitals with quality assurance, technology assessment and management of clinical IS.

Rollo and fellow executives William Jessee and Paul Shoemaker will start with a staff of approximately 90 people, Noland said. Initial contracts will be with Humana, he added, but the arrangement is nonexclusive; like its two sister subsidiaries, the technology assessment company is free to seek contracts beyond Humana.

Todd Richter, an analyst at Dean Witter Reynolds, Inc., said he expects many small to midsize hospitals to welcome the service, despite the fact that in some sense they will be buying IS expertise from a competitor.

"Competition isn't really a factor here," he noted. "The point is that for

years Humana has been the clear leader in evaluating medical technology in terms of cost-effectiveness. This isn't a product they're selling; it's an expertise." If you own 80 hospitals, Richter added, "you can afford to develop it. If you own three, you can't." Those hospitals that increasingly need to benefit from well-honed assessment skills but are in the can't-afford category, he said, may look favorably on the opportunity to cash in on Humana's research at an affordable price.

Randall Huyser, an analyst at Furman Selz, Inc., agreed. However, he pointed out, even though its expectations of success outside the Humana fold are reasonable, the new IS spin-off is a minor element of Humana's overall reorganization strategy.

The "inherent conflict between Humana's two major businesses," Huyser said, is at the heart of the company's financial problems. "The existence of the health plan side has alienated some of the doctors at [Humana-owned] hospitals," he said, triggering a sharp fall-off in so-called "private-pay" — non-government subsidized — patients.



Strategic

Shifts

USX diversifies into information services arena

BY THOMAS HOFFMAN
CW STAFF

PITTSBURGH — Once an icon for U.S. manufacturing, the nation's rust belt has eroded during the past 20 years into a mere handful of manufacturing sites across western Pennsylvania and the Ohio Valley. Its decline has been hastened as foreign nations have ramped up their steel output at lower costs.

However, the savviest U.S. steelmakers have diversified into other industries to supplement their diminishing revenue: Witness, for instance, USX Corp., which recently formed a separate information technology subsidiary.

The yet-unnamed information technology subsidiary, a unit of USX Engineers and Consultants, Inc., will be overseen by Norbert J. Connors Jr., a 32-year USX veteran who has served as the company's general manager of the computer technology group since 1987.

Connors said the new unit's primary focus will be on delivering information services such as systems integration to other process industry members.

A developing group

The unit has evolved during the past five years, according to Connors. In 1991, USX entered a joint venture with Kobe Steel Co. in Japan to form USX-Kobe, a galvanized steel manufacturer. Connors said USX's computer technology unit won a competitive bid to supply the joint venture with a relational database management system-based order-entry tracking system.

Connors declined to reveal which other systems integrators bid on the project. However, he said the new unit will compete against Andersen Consulting, IBM and Digital Equipment Corp. The unit is currently bidding to supply Kobe of America's sales office with an order-entry system similar to the one it is building for USX-Kobe.

So far, the unit has 100 employees working on four projects, including information systems consultation for another major steelmaker.

Connors said he believes the new unit is well-positioned to provide systems integration, application development, consultation and other services to other process industries.

He defined the latter niche as including manufacturers of steel, aluminum, copper, brass and

even forest products.

Connors would not divulge the new unit's projected revenue. However, he said, careful analysis led USX to view systems integration as a substantial growth market.

"I don't kid myself. The business, in the early years, is not going to make or break USX Corp.," Connors said.

Given the underwhelming track record of commercial and industrial firms' IS spin-offs of late, so conservative an outlook may be the better part of valor. During the past several weeks alone, Dallas-based paper products player Kimberly-Clark

THE SAVVIEST U.S. steel-makers have diversified into other industries to supplement their diminishing revenue.

Corp. has effectively folded its once-promising IS spin-off, and retail giant Sears, Roebuck and Co. has tacitly acknowledged its IS subsidiary's lack of viability by merging the company into a new network outsourcing joint venture to be majority-owned by IBM subsidiary Integrated Systems Solutions Corp. [CW, Aug. 24].

Nothing in stone

Connors said that although the USX unit hadn't planned to offer disaster recovery or outsourcing services to customers, he isn't ruling out either possibility. "We have talked to a few [telecommunications] providers to set up a telecom site at our facility to allow people in this geographic region to set up connections here," Connors said.

He added that the unit has already received several inquiries regarding outsourcing services. Connors said the unit will provide those services "when it makes sense."

Although it operates independently of USX's computer technology group, the unit will draw on USX's data center capabilities, Connors said.

Connors said his former responsibilities will be split between Raymond Rezac, who will oversee USX's data center operations, and Brian Jones, who is responsible for systems development.

CALENDAR

SEPT. 13-19

Software Development Conference and Seminar '92. Boston, Sept. 13-18 — Contact: Miller Freeman Publications, San Francisco, Calif. (415) 905-2741.

Buscon '92/East. Boston, Sept. 15-17 — Contact: Buscon '92, Norwalk, Conn. (203) 852-0500.

DOD-STD Conference. Washington, D.C., Sept. 15-17 — Contact: David Malbor Associates, Inc., Needham, Mass. (617) 449-6554.

Crystal Ball '92. San Diego, Sept. 17-19 — Contact: Accucol, San Diego, Calif. (619) 689-7220.

SEPT. 20-26

Sapphire '92. Orlando, Fla., Sept. 20-23 — Contact: Sylvia Bauer, SAP Canada, North York, Ontario (416) 229-0574.

Pen-Based Expo. Los Angeles, Sept. 21-23 — Contact: Digital Consulting, Inc., Andover,

Mass. (508) 470-3880.

Image World. New York, Sept. 21-25 — Contact: Benita Roumanin, Knowledge Industry Publications, Inc., White Plains, N.Y. (914) 328-9157.

Virtual Reality '92. Westport, Conn., Sept. 23-25 — Contact: Meckler Conference Management, Westport, Conn. (203) 226-6967.

The Fifth Annual New England Computer Operations Conference. South Portland, Maine, Sept. 24-25 — Contact: Jerome Lemelin, Portsmouth Naval Shipyard, Portsmouth, N.H. (207) 438-2815.

SEPT. 27-OCT. 3

Sensors Expo's Seventh Conference. Chicago, Sept. 29-Oct. 1 — Contact: Expocon Management Associates, Inc., Trumbull, Conn. (203) 374-1411.

The Sixth Annual Strategic Issues Conference and Client Forum. La Jolla, Calif., Sept. 29 — Contact: Computer Intelligence, Santa Clara, Calif. (408) 980-4300.

CASE World Conference & Exhibition. Boston, Sept. 30-Oct. 2 — Contact: Digital

Consulting, Inc., Andover, Mass. (508) 470-3880.

CD-ROM Expo '92. Boston, Sept. 30-Oct. 2 — Contact: Mitch Hall Associates, Dedham, Mass. (617) 361-2001.

Software Publishers Association (SPA) Annual Conference. Washington, D.C., Sept. 30-Oct. 3 — Contact: SPA, Washington, D.C. (202) 452-1600.

Graph Expo East '92. New York, Oct. 3-6 — Contact: Graphic Arts Show Co., Reston, Va. (703) 264-7200.

OCT. 4-10

The New Tools for Design and Design Production Conference. New York, Oct. 4-6 — Contact: The Center for Computer Graphics for Design, Santa Fe, N.M. (505) 986-0523.

Repository AD/Cycle International Users Group Conference. Chicago, Oct. 4-7 — Contact: Repository AD/Cycle Group, Santa Monica, Calif. (310) 394-8305.

Electronic Data Interchange Association (EDIA) Annual Conference. Nashville, Oct. 5-8 — Contact: Gregory Harter or William Myers, EDIA, Alexandria, Va. (703) 838-8042.

What is re-engineering, anyway?

CONTINUED FROM PAGE 97

filament cycle. It compressed the chain of steps along the entire production line, making it shorter and faster. It avoided layoffs by having fewer but different people in the mix. And it is now revamping its IS structure.

However, Hammer warned, revamping your systems is not tantamount to re-engineering.

"Business process re-engineering means a radical redesign of the way you work," he said. "IS is the mechanism that allows us to do the processes differently. Too many organizations fall into the cop-out of building new computer systems and saying it's re-engineering."

That message came through loud and clear at Equitable Resources, Inc. (ERI), a Pittsburgh-based gas and oil exploration company. As ERI executed its strategic business plan to grow through acquisitions, it discovered that it was often dancing in the dark.

"We had a lot of data, but we weren't sure we had a lot of information," said Al DeVito, ERI's director of strategic planning. "We were looking at where we wanted to be as a company and what our competition would be doing the next five to 10 years."

In the books

ERI had good accounting information concerning what happened the previous month, the previous quarter or the previous year. But it couldn't determine whether investing in a major company or buying an oil field was a wise economic decision.

The islands of data exploded when ERI began aggressively acquiring gas and oil properties as part of its strategic business plan. The acquisitions were de-

signed to gain instant entry to pieces of the business in which ERI was not engaged but in which it wanted to be established before its competitors. Handling the additional data about the acquisitions' returns on ERI's investments stretched the IS staff to the max.

To cope with the demand, more personal computers started sprouting at employees' desks. So ERI called Alexandria, Va.-based Information Engineering Systems Corp. (IESC) to help with the sudden migration from the mainframe to the desktop. With IESC's assistance, ERI is migrating from an IBM System/36 to a distributed system based on PCs and laptops.

Maring said re-engineering is the correct term for the changes going on at his company — technological redesigns that, like those at ERI, were drafted to facilitate new business blueprints.

"We had to set up new paths into systems and develop shared databases," Maring said. GTE also had to integrate its own query tools so it could access the legacy systems that remained from its original IS setup. That "encircling," as Maring called it, allowed GTE to continue using those systems, some of which are 20 years old, rather than re-writing them or trashing them. GTE Telephone went inside as well as outside for its new IS. It turned to a third party to build a terminal emulator and used its in-house talent to create an LU6.2 peer-to-peer network.

It's been quite a metamorphosis for an "all-Blue" shop that lived and died by the mainframe. Business processes were done manually — and very slowly — on 3270 terminals. Now the company is implementing

the processes as applications on its Hewlett-Packard Co. workstations via its Ethernet-based client/server network.

The company made the move because it calculated that a million instructions per second (MIPS) on the desktop costs \$100 while a MIPS on the mainframe goes for \$100,000.

Who cares?

At the end of the day, does anybody really care which came first, the new IS or the new way of doing business? Terry Smith, IS vice president at St. Louis-based Moog Automotive, Inc., said no. His firm's systems change came first, he said, but was nonetheless intended to drive business change.

"We knew by changing our systems that we would change the way we did business, but we didn't expect nearly the payback we got," Smith said.

Moving from a mainframe-based environment to a client/server system running San Jose, Calif.-based Cooperative Solutions, Inc.'s Ellipse software enabled the company to write the code for its air-tune warranty tracking system in a master installer in 2½ days, he said, rather than the anticipated 130 days.

But does business improvement, which does not make for re-engineering as defined by Hammer, amount to business change, which does? Smith said the distinction may be compelling only to semantic purists.

"The term 're-engineering' has been thoroughly marketized," he said. "But the only thing that matters is that it's real world and it works."

Schatz is a free-lance writer based in Washington, D.C.

IBM staffers get 'SMART' in the UK

Unique concept was designed to push employees away from desks into field to work with customers

BY RON CONDON
IDG NEWS SERVICE

LONDON — IBM's UK-based marketing staffers each have a computer, but they are going to have to get to the office early to be sure they get a desk.

The company has introduced a new office space allotment scheme under which employees carry a portable computer and spend their office time at whatever desk is available.

The introduction of the concept, which is called Space Morale and Required Technology (SMART), coincides with a major relocation of staff members in the south of England. IBM's British subsidiary has moved 1,000 marketing staff members into a new office complex in Feltham near London's Heathrow Airport.

THE STAFF CAN use any desk at their home location on a drop-in basis to access electronic mail and work on the company's internal computer network. Many will be provided with portable computers.

The new location, called Bedfont Lakes, houses marketing staff members who were moved from IBM offices in Richmond, Brentford and Chiswick. Those offices will be closed.

This is the first time the company has used SMART, and according to officials, the concept was designed to ensure that "territoriality" does not become an issue.

The staff can use any desk at their home location on a drop-in basis to access electronic mail and work on the company's internal computer network. Many will be provided with portable computers.

The move is in line with recent comments by Nick Temple,

the new chief executive of IBM UK. Temple said he had to take "a chainsaw to the organization" and that he wanted to get most employees out of the office and interacting more closely with

the customers.

The new offices, which will become the company's National Marketing Centre, give IBM 185,000 sq ft of space.

The buildings form part of a


square that IBM developed in conjunction with MEPC, its first joint venture property development company outside North America. The total development area is 343,000 sq ft, and the re-

maining offices will be leased to third parties.

Keeping all the work in the family, IBM gave the job of outfitting the offices and preparing them for occupation to Procord, a property and facilities management company spun off by IBM last year.

In its previous corporate incarnation, Procord was IBM's internal property department.

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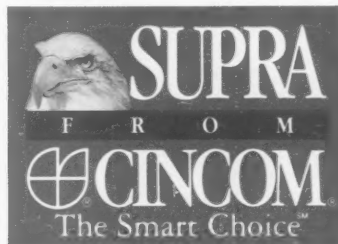


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COMPUTER CAREERS

Two routes to the top: MBA or technical degree . . .

Which is the surest route to the CIO suite, a technical degree or an advanced business degree? This week free-lance writer Sally Cusack compares the career paths of two chief information officers, one of whom earned an MBA and another who obtained a master's degree in computer science.

Richard M. Nydick thanks his master's in computer science for getting his foot in the door for several high-level information systems jobs.

But to stay inside, he's also had to depend on interpersonal and business skills gained in the many IS jobs he's held since college.

As an undergraduate at City University of New York and later as a graduate student, Nydick worked as a senior programmer at American Express Corp.

But Nydick, who wanted to stay in the New York area while completing his master's degree, left Amex to accept a senior programmer/analyst job at Johnson & Johnson in 1978.

During graduate school, Nydick customized his curriculum to include courses in business,

economics and manufacturing. The goal, he explains, was to round out his education, better preparing him for the business world.

The rest reads like a classic 1980's recipe for success.

After a two-year stint at Johnson & Johnson, Nydick moved on to management positions at several large corporations, including Knickerbocker Toy Co., Revlon, Inc. and AGS Information Systems.

Tough times followed. Knickerbocker went out of business, AGS was absorbed by Nynex Information Solutions Group and Rev-

lon decided to outsource. Still, Nydick applied his experience to his current position at The Hibbert Group, which he joined last year. Today, as vice president of MIS, he has responsibility for telemarketing, inquiry and pro-

gram administration.

While the IS road hasn't always been smooth for Nydick, he says moving from company to company has had its benefits. He adds that technical know-how gained in his master's program has served him well throughout his career.

"There aren't many systems I haven't worked on," he says, listing IBM mainframes, minicomputers from Digital Equipment Corp. and Hewlett-Packard Co. and IBM Personal Computers and compatible systems.

This broad exposure has proved valuable recently, he says, as companies move toward more networked, heterogeneous environments.

Skills without MBA

Interestingly, Nydick has looked into getting an MBA to supplement his technical degree. But in researching degree requirements, he found his work experience had already provided most of the business skills needed.

"It was a matter of practical payback," he explains. "It would have been a lot of time and energy to get formally accredited for skills I already had."

Lacking an MBA has never been an issue, he adds, though he has beat out many MBA holders for jobs. He says that although 90% of his competitors had MBAs, once he got past the first interview, it didn't matter.

M.S. background

RICHARD M. NYDICK

EXPERIENCE

1991-Present
Vice President, Management Information Systems and Data Services, The Hibbert Group
 Direct programming, computer operations, laser printing, data entry, telemarketing, inquiry and program administration functions for the company. Develop a hardware, software and data communications strategy and architecture to support the future of the organization and meet the needs of the customer base. Integrate the business and technical aspects of the organization.

1987-1991
Project Development Director, Nynex Information Solutions Group (AGS Information Systems)
 Developed project and systems integration business. Also responsible for management consulting, technology assessment, proposal development, sales, sales support and large-scale project management for a wide variety of distribution, manufacturing, insurance and financial companies.

1982-1987
Director of MIS, Professional Products Group, Revlon, Inc.
 Direct responsibility for all function activities of business analysis, systems and programming, database administration, data center operations, technical support, computer user services and training.

1980-1982
Manager of Systems Development, Warner Communications, Inc. (Knickerbocker Toy Co.)
 Managed all financial and manufacturing systems. Responsible for business analysis, system development, programming and related hardware, software and communications.

1978-1980
Senior Programmer/Analyst, Johnson & Johnson, Inc.

1975-1978
Senior Programmer, American Express Co.

EDUCATION

M.S. Computer Science, Polytechnic University of New York, 1981
 B.A. Mathematics, H. H. Lehman College, City University of New York, 1975



Nydick: Lacking an MBA has never been an issue

He also noted that he would not have been considered seriously for several jobs, including the one at Revlon, without a master's in computer science.

He's confident that a strong technical background is essential for a CIO. Thanks to his degree, Nydick says, "evaluation, selec-

tion and implementation of hardware, software, communications, development and integration became a natural process as opposed to difficult or vague tasks."

His advice to students contemplating a master's program: Be sure to integrate solid business and good technical courses.

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When Nicholas Rudd graduated from Columbia University with an MBA in 1967, he never envisioned himself as a chief information officer of a major international advertising agency.

In fact, the title "CIO" had not yet been coined. Rudd's experience with computing was limited to a not-for-credit course called "Intro to Computing."

"I went all the way through my graduate degree without ever seeing a computer," Rudd recalls.

But in June 1968, he entered Young & Rubicam, Inc.'s account representative training program. There, he got his first look at the "glass house" run by the electronic data processing department. The raised floors, powerful air-conditioning and "reams of paper everywhere" impressed

the trainees, Rudd says, though "no one understood it."

Rudd's first up-close experience with data processing came a year later, when he was assigned to oversee the automation of a manual billing system.

While he preferred pitching clients to following clerical workers preparing data for conversion, Rudd admits he found the automation process "interesting."

Rudd encountered computers again in the mid-1970s in a staff

position assisting the agency's new business development executive.

Rudd says he realized computers could be a great boon to organizing information. He went on to oversee several data processing initiatives for the new business development group. One evolved into the company's first business database — a project that continues today.

Down the road

As an MBA holder, Rudd says, he was trained to take a long-term view of any situation.

For example, when developing an in-house training program, Rudd came up with the idea of creating a central resource center that would save money and improve use in the long haul.

In the 1970s and 1980s, Rudd became more involved in personnel and human relations projects. He built a corporate staff, linked human resources with strategic planning and business units and conducted training sessions on the importance of managing corporate information. For five years, Rudd pitched corporate officers each year on the need for a single person to plan and oversee technology.

"I kept saying, 'We aren't paying enough attention to computers,'" he recalls. "Corporate ex-

ecs kept saying 'Yeah, yeah, yeah.' Finally in 1990 they said, 'OK, if this is so important, YOU do it,' and they appointed him the company's first CIO.

Initially, Rudd says, he had mixed feelings about the role. But thanks to his excellent relationship with an experienced information systems director hired several years earlier, the transition went smoothly.

Today, Rudd, who is also a senior vice president at the firm, presides over a highly decentralized global technology empire that spans 279 offices in 53 countries with a wide variety of equipment and approaches. He guides 150 IS professionals worldwide and oversees outsourcing.

Rudd's business sense seems to have paid off: In six years he has shrunk corporate IS staff from 75 to 22. Many have gone to business units, he explains, whose IS heads report to him.

Rudd says he's also thankful for his MBA for another reason. "Increasingly, the demands on a CIO are not technological," he says. "They are business needs that have to be met."

Business skills pay

As a result, Rudd says, he spends a great deal of time supporting and trying to understand the business activities of the ad agency. It's here that his skills in marketing, customer management, strategic planning, organization design and development really pay off, he says.

Rudd credits his future focus



Rudd: Trained to take long-term view

MBA background

NICHOLAS RUDD

EXPERIENCE

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Vice President of Management Services, Y&R

Began to build a corporate function for strategic planning, organizational development and human resource management.

1975-1979

Vice President and Management Supervisor, Y&R

Progressively responsible positions in managing client relationships.

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Account Supervisor — advertising, Y&R

1968-1969

Account Executive — advertising, Y&R

1968-1969

Staff Assistant in Y&R's training program.

Training period in advertising for new-hire MBAs.

EDUCATION

MBA, Columbia University Graduate School of Business, 1967

B.A. Liberal Arts, Columbia College, 1964

and broad view to his MBA. "If you look at what there is to do in business terms, you can see there are solutions other than writing new code and developing custom applications," he says.

He warns, however, that a traditional MBA curriculum might not be the adequate preparation for business today.

Programs don't always reflect changes now sweeping industry, he says, noting radical changes in

manufacturing and marketplace economics that have taken place during the past few years.

"Ultimately, your academic preparation is just a place to start. In the long run it's up to you to understand needs, take advantage of circumstances and be useful to your organization," Rudd says.

Cusack is a free-lance writer based in Marston Mills, Mass.

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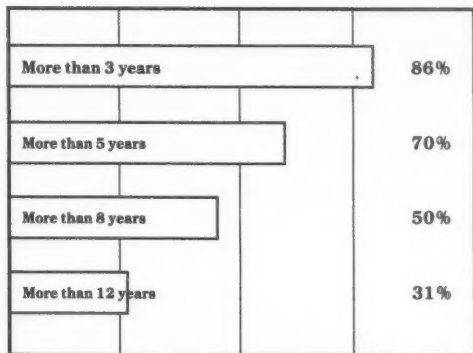
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These positions require:

- A minimum of 2 years' programming (any language) on the AS/400 platform with a broad range of knowledge at the applications level, including CL and utilities.
- The desire to work with both AS/400 experts and AS/400 users in problem resolution.
- Excellent written and oral communication skills.
- A strong commitment to learning, both personal and professional goals.

AS/400 PC Support

Keane, Inc. is also searching for AS/400 Professionals who have direct knowledge and experience working with AS/400 PC support.

Please contact Doug Moore at (800) 876-1552 and send/fax your resume to his attention at Keane, Inc., (507) 281-8520, 1605 N. Broadway, Rochester, MN 55906. An Equal Opportunity Employer.

Programmer/Analyst: Surveys and analyzes computer applications in terms of programming requirements and allocated computer resources. Researches, organizes, analyzes, develops logic, implements, codes, tests, and documents computer programs and transforms program specifications into efficient information processing systems, especially in SNA/UNIX, VAX/VMS, and PC environments. Assists Systems Analyst and Computer Systems Analyst in development of general designs, detailing design guidelines, preparing program specifications, analyzing effects of enhancements and modifications on automated systems, and evaluating and solving user problems or questions. Prepares status reports of programming progress, schedules and problem areas. Installs new systems and maintains library of computer programs and associated documentation. Trains and consults user personnel in using new and modified systems. Evaluates emergency situations and makes recommendations to correct them. Requires M.S. or equivalent in Computer Science plus one yr. experience as Programmer/Analyst. B.S. in Computer Science plus two yrs. experience as Programmer/Analyst is equivalent to M.S. Education or experience must include successful completion of at least three projects using C language in SNA/UNIX or VMS environment and one project in UNIX. Resume required. 40 hrs/wk, 7:30 a.m. - 4:30 p.m., \$2,775 per month. Send resume with Social Security number to Indiana Department of Workforce Development, 10 North Senate Avenue, Room 103, Indianapolis, IN 46204, Attention: G.R. Reagle. Refer to ID#3268572.

SYSTEMS ANALYST(S) (CHICAGO, IL) Design, dev. and modification of intercomputer financial/ad-minis. control systems for multinational corporation. Liaison with management personnel to ascertain needs/specifications. Work performed in COBOL/CICS using DATA DICTIONARY. Req: 2 yrs. exp. in job offered and one yr. exp. in NATURAL I and II/ADABAS systems design and COBOL/CICS conversion to NATURAL/ADABAS. M-F, 9-5, 40 hrs/wk, \$45,000/yr. "Must have proof of legal authority to work permanently in the U.S." Send resume in duplicate to: Illinois Dept. of Employment Security, 401 South State St. - 3 South, Chicago, IL 60605, Attn: Maxine Counts, Ref: #V-L5899C. No Calls. An employer paid ad.

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technical workstations	30,943
Software Vendor	160,264
for large-scale systems	71,152
for medium-scale systems	81,799
for small-scale systems	72,212
for personal computers	66,366
for technical workstations	26,022
Non-CPU Computer Products Manufacturer	34,311
VAR/Dealer/Retailer	44,773
DP Service Bureau/Contract DP Services	52,375
Consulting/Planning	112,149
Manufacturer (not computers)	229,608
Insurance	62,539
Healthcare	57,788
Banking/Financial Services	123,348
Government Federal/State/Local	107,915
Business Service (except DP)	35,940
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Public Utilities	43,687
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(Ref #48192) to analyze, design, develop & implement application software on IBM mainframe under MVS/ESA operating system using relational database such as CICS, DB2, SQL, TELON, CSP, VS-COBOL, II, C, REXX, CLIST, VSAM, BMS, SDF-II, QMF, & TSO/ISPF. ED & EXP: Bachelors in Computer Sc, Engg, Bus Adm or Sys Anal & 2 yrs exp in the job offered or as Sys Prog/Analyst, Sys Engg or Database Admin/Leader. RELATED EXP: database or appl. software devel on IBM mainframe under MVS/ESA operating system using CICS, DB2, SQL, TELON, CSP, VS-COBOL, II, CLIST, VSAM, BMS, QMF, & TSO/ISPF. Pay is \$34,200/yr. 40 hr/wk.

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(Ref #48392) to analyze, design & develop an integrated student information system including input analysis, specifications, unit test, integration test & production support of a large IDMS based integrated Student Information System for university applications. The test support to the design of applications using IBM 3090 (MVS/ESA, MVS/ADSC, ADSA, CLM, JCL, MVS/ESA, BMS, SDF-II, QMF, & TSO/ISPF. ED & EXP: Bachelors in Computer Sc, Engg, Bus Adm or Sys Anal & 2 yrs exp in the job offered or as Sys Prog/Analyst or Sys Anal. RELATED EXP: design & impact analysis of computer systems of large database system on IBM 3090 mainframe using IDMS/DBDC, ADSO, ADSA, CLM, JCL, & MVS/ESA, MVS/XA & TSO/ISPF. Pay is \$34,200/yr. 40 hr/wk.

SYSTEMS ANALYST
(Ref #52092) to design & develop applications in Graphical User Interface & Client Server OS environment, including developing API system, automating & setting directions for Quality Assurance & Test Support on Unisys B20 under COTS/BTOS operating systems using C & PL/M languages. ED & EXP: Bachelors in Computer Sc, Engg, Bus Adm or Sys Anal & 2 yrs exp in the job offered or as Prog Anal, Anal or Contractor. RELATED EXP: software development using Unisys COTS/BTOS operating system & C & PL/M languages. Pay is \$32,300/yr. 40 hr/wk.

SOFTWARE ENGINEER
(Ref #52192) to port Unix SVR4.0 on Unisys U6400 (Multi processor based Risc Platform) & U6000/65 (Multi processor based Intel Platform) including development of test scripts for modules of TTY, STREAMS, TCP/IP, NFS & memory/cache controller subsystems. Porting, enhancing, admin & supporting proprietary Network Operating System & its applications using NetBSD based on Token Ring interface under Unix SVR4.0 on U6000/65. ED & EXP: Bachelors in Computer Sc, Engg, Bus Adm or Sys Anal & 2 yrs exp in the job offered or as Sys Anal, Software Prog or Consultant. RELATED EXP: development of test programs for testing hardware & Network boards, I/O ports of UNIX systems, & memory & TTY subsystems. Pay is \$32,300. 40 hr/wk. Please send resumes to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #. Employer Paid Ad.

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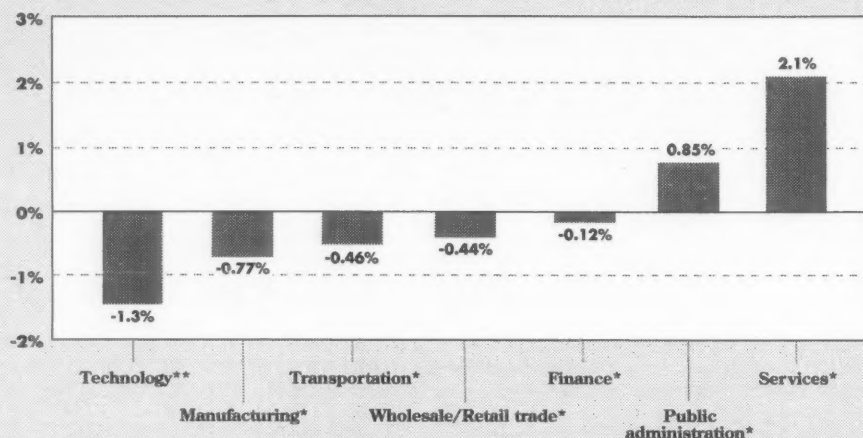
Computerworld/Corptech Career Index

IN THE CELLAR - Technology manufacturers lost 1.3% of their work force during the past year.

Percent change
in number of
employees from
April 1991 to
April 1992

*Source: U.S. Department of
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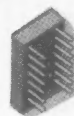
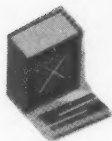
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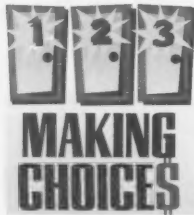
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MARKETPLACE

Keeping up with product cycles



BY KARLYN GALE
SPECIAL TO CW

You bought into 486-based personal computers nine months ago. You got a great deal and you think the technology will be around for a while. You're really happy, except for one thing: The machine you bought has already undergone three price cuts, and 586 technology will be available in early 1993.

Anytime you invest in new technology, you play a game of "guess the product life cycle." Vendors continually narrow the window between a new product and the arrival of its technological replacement in order to stay competitive. And that wreaks havoc on your purchase decision.

Once you understand how life cycles work, you will be better prepared to time your purchases.

Generally, PCs and workstations have more compressed life cycles than big-iron machines, al-

though both are shortening. PC vendors take about two years to come out with a new machine, compared with their previous three-to-four-year span.

Large-system vendors are in the five-year range compared with their former six-year cycle, while midrange systems take two to four years compared with six to 10 years in the past.

Waiting game

The No. 1 rule of thumb: Don't buy a PC or workstation the day it's announced. If you can afford to wait six months, chances are you can get that same PC for at least half off the starting price.

But don't wait too long. Another vendor is bound to leapfrog that announcement with its own, and the previously "new" product stands a good chance of being made obsolete, which would place you back at square one.

For example, Compaq Computer Corp. just finished revamping its entire PC line and cutting prices on existing products when Dell Computer Corp. came along and cut its PC prices even further. Several clone makers did the same. It's only inevitable that Compaq will cut prices on its newly announced products during the next few months.

In the midrange

Even more radical have been the life cycle changes in medium systems, which have dramatically

changed the way buyers should plan their purchases.

Take Digital Equipment Corp.'s recent replacement of the VAX 6000 Series 600 with the VAX 7000 Series 600.

Users looking to buy a VAX system in the performance range of the VAX 6000 Series 610 or the

VAX 7000 Series 610 are better off buying the VAX 7000 because it is board-upgradable to the follow-on systems or to future technology such as RISC-Alpha.

In addition, the VAX 7000 Series 600 is a safe bet because DEC is expected to enhance it in 12 to 15 months.

If you don't plan to purchase until the summer of 1993, another strategy is in order: Wait for the new systems to be announced

that offer better price/performance. Or you can purchase a VAX 7000 Series 610 because its list price will most likely be cut at that point.

Unlike PCs, whose prices are almost guaranteed to drop within six months of introduction, mid-range products need to be out for about a year before their prices fall. Even bigger savings come when the vendor is about to replace the system.

Purchase highs and lows

The following are the four major phases through which all computer equipment passes:

► **Introduction:** Begins when the equipment is first actively marketed by the vendor. Lasts approximately three months for PCs and midrange systems.

► **Growth:** Occurs once the product has been accepted by the market and sales increase substantially. Competition from vendors is strong during this stage. As a result, pricing, features and other marketing issues start to become important. However, demand is strong enough that original pricing remains relatively unchanged. Lasts three months for PCs, four months for midrange systems.

► **Maturity:** Has traditionally been the longest stage in the product's life cycle. Demand begins to ebb, and sales growth slows down. Price cuts occur or discounts increase for the product as sales of the replacement product increase. Lasts three months for PCs, five months for midrange systems.

► **Decline:** Sales decline, and the product is no longer marketed. The residual value of the product is low and largely dependent on the reputation of the equipment, the installed base and the vendor's maintenance and support policies. Lasts three months for PCs and midrange systems.

Residual values

Short product life cycles dramatically change computer equipment's resale value. You can no longer get back half of what you paid when you try to sell a system two years after you bought it.

The faster products are announced, with more aggressive price/performance improvements, the faster the equipment's value will decline after purchase.

Compressed life cycles have brought residual values to an all-time low today. So even if you hear vendors tout high residuals because of an easy board or chip upgrade, don't believe them.

Even though upgradable equipment may seem to retain value — because it won't appear on the secondary market as fast as equipment that consists of full box-swaps — the used value of the original system must still drop to account for the price/performance improvements of the new system, less discounting.

Gale is a senior research analyst at Technology Investment Strategies Corp. in Framingham, Mass.

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*Source: Projected Total Audience Research Study Paid Subscribers of Computerworld, IDG research Services, August 1990.

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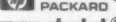
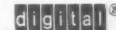
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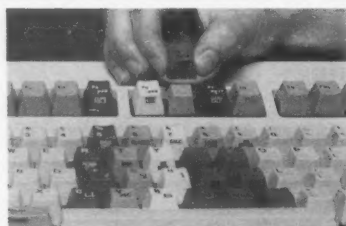
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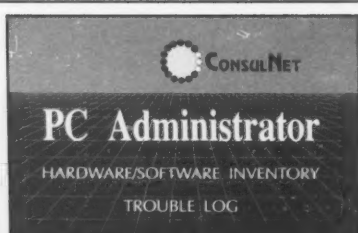
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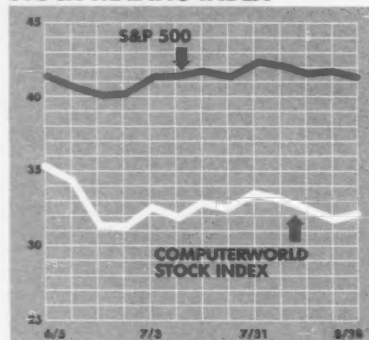
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STOCK TRADING INDEX



Industry Almanac

ANALYSIS IN BRIEF: PCs AND SEMICONDUCTORS

Andrew Neff and John Ford
Bear, Stearns & Co.
Aug. 14, 1992

Unit volumes of personal computers continue to jockey upward, in part because of the ongoing price wars. As pressure builds in the PC industry, new products and price cuts from the front-runners have stunted many second-tier players, forcing layoffs, losses and cutbacks. September appears to be the month for price cuts, as vendors such as IBM (IBM), AST Research, Inc. (ASTA), Dell Computer Corp. (DELL) and Compaq Computer Corp. (COMPAQ) are slated to introduce new products in the low-price category.

Despite all of the unrest, demand for Apple Computer, Inc. (AAPL) products remains solid. On the PC side, the shift to 486-based products will likely benefit Intel Corp. (INTC).

LISA DAVIDSON

Chips and dip

Selected microcomputer and semiconductor stocks trading near year highs

	52-week high	Closing price 8/25	Rating*
Dallas Semiconductor Corp.	\$10.88	\$10.00	●
Motorola, Inc.	\$88.13	\$85.13	●
Texas Instruments, Inc.	\$42.38	\$38.00	●
Stocks trading close to year lows	52-week low	Closing price 8/25	Rating*
Advanced Micro Devices, Inc.	\$7.38	\$9.13	●
Apple Computer, Inc.	\$41.50	\$44.38	●
Chips and Technologies, Inc.	\$4.13	\$4.25	●
Everex Systems, Inc.	\$2.13	\$2.25	●
Micron Technology, Inc.	\$12.13	\$15.00	●
Tandy Corp.	\$22.25	\$23.38	●
VLSI Technology, Inc.	\$6.00	\$6.50	●
Xilinx, Inc.	\$17.25	\$20.63	●

*Shearson Lehman Brothers, Inc. rating

Not rated ● Neutral Outperform

● Buy ● Underperform ● Hold

Source: Shearson Lehman Brothers, Inc., Wall Street Journal

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, AUGUST 28, 1992

TOP PERCENT GAINERS			TOP PERCENT LOSERS			TOP DOLLAR GAINERS			TOP DOLLAR LOSERS		
Exch	52-Week Range	Aug. 28 Close	Exch	52-Week Range	Aug. 28 Close	Exch	52-Week Range	Aug. 28 Close	Exch	52-Week Range	Aug. 28 Close
Wing Labs Inc. (B) (L)	83.47		Picturatel Corp. (L)	-27.56		Microsoft Corp.*	4.63		Picturatel Corp. (L)	-4.38	
Computer Publishing Corp.	25.00		Chips and Technologies (L)	-25.00		Matsushita Electronics	4.13		Adobe Systems Inc.	-3.75	
Riastrop (L)	17.65		Computerworld Corp. (L)	-17.71		BMC Software Inc.	2.98		Computerworld Corp. (L)	-2.50	
Gateway Communications	17.59		Ross Systems	-16.17		Parametric Technology	2.88		Nynex Corp.*	-2.25	
Sierra Semiconductor (L)	14.29		Data Switch Corp.	-14.81		Novell Inc.*	2.75		Computerworld Corp. (L)	-2.13	
Archive Corp.	13.21		Comshare Inc.	-14.10		Chicom Corp.	2.25		Southwestern Bell Corp. (H)	-2.00	
Intel Corporation Corp. (L)	12.56		Computer Sciences* (L)	-1.38		Software Publishing Corp.	2.00		Computer Sciences* (L)	-1.38	
Chicom Corp.	10.34					Compaq Computer Corp.*	1.88		Harris Corp.	-1.38	
Communications and Network Services Off 1.01%											
OTC	15.00	8.00	3COM Corp.*	11.63	0.75	6.90	OTC	17.25	3.58	11.75	7.38
NYS	70.63	56.25	American Info Techs Corp.*	68.63	-1.13	-1.61	OTC	17.25	3.58	11.75	7.38
ASE	44.88	32.88	AT&T*	42.25	-0.50	-1.17	OTC	14.13	3.38	11.75	7.38
OTC	4.25	0.88	Artel Communication Corp. (L)	1.13	0.13	12.50	OTC	8.50	2.00	11.75	7.38
NYS	50.63	40.25	Bell Atlantic Corp.	48.63	-0.63	-1.27	OTC	16.50	6.25	11.75	7.38
NYS	55.50	43.38	BellSouth Corp. (H)	0.88	-1.17	-1.27	NYS	25.25	13.75	11.75	7.38
NYS	6.88	3.75	Bolt, Beranek & Newman	3.75	-0.50	-1.17	OTC	31.75	15.25	11.75	7.38
NYS	65.88	36.63	Cabletron Systems	56.63	1.13	2.03	OTC	51.00	15.50	11.75	7.38
OTC	31.00	17.50	Cisco Systems Inc.	2.25	0.00	10.34	NYS	15.50	15.50	11.75	7.38
OTC	53.75	18.63	Compression Labs Inc.	6.13	-0.88	-12.50	OTC	34.25	12.34	11.75	7.38
OTC	35.25	6.00	Data Switch Corp.	4.25	-1.48	-1.81	OTC	23.75	14.50	11.75	7.38
OTC	3.98	0.88	Digital Comm. Assoc.*	18.63	0.25	1.36	OTC	6.63	2.13	11.75	7.38
NYS	23.63	12.63	Digital Systems Int'l Inc.	9.25	0.25	2.78					
OTC	16.75	8.00	DSO Communications	0.38	0.50	6.12					
OTC	7.00	3.63	Flintec Corp.	1.375	0.00	0.00					
OTC	10.88	4.75	General Datacomm Inds.	1.69	0.25	17.39					
OTC	37.50	10.50	Gateway Technologies Inc.	3.00	-0.38	-1.11					
OTC	3.38	1.13	General Datacomm Inds.	3.00	-0.38	-1.11					
OTC	2.25	0.88	GT Corp.	34.75	-0.25	-0.71					
NYS	55.63	21.13	ITT Corp.	36.13	-0.50	-0.75					
NYS	53.63	28.63	Microcom Inc.	7.75	-0.13	-3.23					
NYS	70.63	50.00	Network Equipment Tech.*	15.25	0.25	2.75					
OTC	36.13	25.25	Proteon Inc.	12.75	0.13	2.75					
NYS	18.25	9.50	Network Systems Corp.	11.13	0.38	3.49					
OTC	51.50	16.50	Novbridge Networks Corp.	15.88	-0.63	-3.79					
OTC	12.00	8.50	Novell Inc.*	34.25	-0.38	-1.08					
OTC	17.88	5.63	Novell Inc.*	50.25	2.75	5.79					
NYS	49.25	31.75	Novell Inc.*	53.25	-2.25	-2.63					
OTC	66.00	31.75	Novell Inc.*	53.25	-2.25	-2.63					
NYS	88.38	69.13	Novell Inc.*	53.25	-2.25	-2.63					
NYS	40.68	32.88	Novell Inc.*	53.25	-2.25	-2.63					
OTC	9.88	4.00	Novell Inc.*	53.25	-2.25	-2.63					
OTC	53.00	10.50	Novell Inc.*	53.25	-2.25	-2.63					
OTC	18.75	7.50	Novell Inc.*	53.25	-2.25	-2.63					
NYS	27.38	11.63	Novell Inc.*	53.25	-2.25	-2.63					
NYS	69.00	53.75	Novell Inc.*	53.25	-2.25	-2.63					
OTC	26.63	13.75	Novell Inc.*	53.25	-2.25	-2.63					
OTC	13.75	4.00	Novell Inc.*	53.25	-2.25	-2.63					
OTC	35.75	14.25	Novell Inc.*	53.25	-2.25	-2.63					
OTC	40.68	32.88	Novell Inc.*	53.25	-2.25	-2.63					
OTC	41.50	24.00	Novell Inc.*	53.25	-2.25	-2.63					
PC and Workstations Up 0.33%											
OTC	14.50	4.50	Advanced Logic Research	4.50	-0.25	-5.26					
OTC	70.00	41.50	Applied Computer Inc.*	45.00	-0.25	0.56					
OTC	32.25	11.25	AST Research Inc.*	12.25	-0.25	-2.00					
NYS	19.25	6.75	Commodore Int'l (L)	10.25	-0.25	-0.26					
NYS	38.75	22.13	Compaq Computer Corp.*	30.63	1.88	6.52					
OTC	29.00	13.81	Compaq Computer Corp.*	30.63	1.88	6.52					
OTC	7.75	2.13	Everex Systems Inc.	2.25	-0.25	-10.00					
NYS	34.00	21.25	Harris Corp.	29.38	-1.38	-4.47					
NYS	85.00	44.63	Hewlett-Packard Co.*	55.75	-1.00	-1.76					
NYS	29.75	14.13	Silicon Graphics	21.88	0.63	2.94					
OTC	35.88	20.75	Sun Microsystems Corp.	26.63	0.75	2.90					
NYS	31.25	22.25	Tandy Corp. (L)	22.88	1.38	6.11					
NYS	11.13	5.13	Teraco Corp.	6.88	0.75	1.94					
OTC	25.50	3.13	Zenith International Ltd.	3.13	0.00	0.00					
Large Systems Up 5.99%											
ASE	20.63	11.63	Amvat Corp.*	13.50	0.38	2.86					
NYS	16.13	7.50	Andrian Corp.	15.38	0.38	2.50					
NYS	16.38	5.75	Conver Computer	0.00	0.00	0.00					
OTC	19.63	1.88	Cray Computer	3.25	-0.13	-3.70					
NYS	52.25	22.75	Fair Research Inc.* (L)	23.63	0.25	1.07					
NYS	22.50	1.13	Data General Corp.	7.75	0.00	0.00					
NYS	65.50	33.25	Digital Equipment Corp.	36.63	1.50	4.27					
NYS	106.38	81.63	IBM*	87.38	1.63	5.90					
OTC	13.25	7.50	IBM*	87.38	1.63	5.90					
NYS	121.25	88.25	IBM*	87.38	1.63	5.90					
OTC	19.75	7.50	IBM*	87.38	1.63	5.90					
OTC	17.88	8.13	IBM*	87.38	1.63	5.90					
OTC	18.38	5.00	IBM*	87.38	1.63	5.90					
NYS	54.25	36.75	IBM*	87.38	1.63	5.90					
NYS	15.13	9.50	IBM*	87.38	1.63	5.90					
NYS	11.75	3.63	IBM*	87.38	1.63	5.90					
ASE	7.50	0.25	IBM*	87.38	1.63	5.90					
Software Off 0.67%											
OTC	68.50	33.00	Adobe Systems Inc.	33.00	-0.75	-10.20					
OTC	13.25	2.50	Alt Corp.	4.00	-0.25	-5.88					
OTC	45.00	11.50	Aldus Corp.	12.00	-1.00	-7.89					
OTC	19.75	8.50	American Software Inc.	8.88	-0.25	-2.74					
OTC	20.00	8.13	Autodesk Inc.	13.25	-1.88	-5.85					
OTC	52.00	23.25	Autodesk Inc.	45.50	-0.38	-0.83					
OTC	37.75	7.63	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	42.50	30.50	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	79.00	37.25	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	20.50	8.00	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	86.75	35.00	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	11.25	3.63	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	14.63	6.50	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
OTC	20.38	7.25	Bachman Info. Systems (L)	7.63	-0.63	-7.58					
NYS	17.00	7.50	Bachman Info. Systems (L)	7.63	-0.63	-7.58					

KEY: (H) = New annual high (L) = New annual low
Computerworld Friday Stock Index
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COMPUTER INDUSTRY

IN BRIEF

Novell up 53% in Q3

Continuing its juggernaut, Novell, Inc. last week posted third-quarter net earnings of \$66 million, an increase of 53% from the comparable period last year. Revenue in the period was up 43% to \$243 million. The Provo, Utah-based firm attributed its strong results to continued demand for network software products and its acquisition of Digital Research, Inc.

Ross Systems, Inc. reported fourth-quarter net earnings of \$2.3 million, up 228% from the corresponding period last year. Revenue for the period rose 24% to \$23.3 million. For the year, revenue and profit rose 23% and 311% to \$75.9 million and \$4.2 million, respectively. The Redwood City, Calif.-based developer cited initiatives into the Hewlett-Packard Co. market and Unix, fourth-generation language and client/server software markets for its strong financial showing.

System Software Associates, Inc. reported a 53% jump in profits to \$5.8 million for 1992's fiscal third quarter compared to \$3.8 million a year ago. The Chicago-based software maker, which caters to the IBM Application System/400 market, booked sales of \$55.6 million, up 49% from 1991's third-quarter tally of \$37.2 million. Sales of AS/SET, the company's application development product, grew for the period, compared with last year, according to a spokesman.

Bachman Information Systems, Inc. credited brisk sales of an enhanced version of its flagship application development tool for contributing to a 45% fiscal fourth-quarter revenue growth to \$15.1 million this year. Profits more than doubled for the quarter to \$1.3 million. Year-end profits totaled \$2.8 million, up 6% from 1991; revenue increased 52% to \$48 million.

Imaging remains key to Wang's future

BY ELLIS BOOKER
CW STAFF

LOWELL, Mass. — The shadow cast by Wang Laboratories, Inc.'s Chapter 11 filing two weeks ago also covers its often-praised electronic document imaging products, including a promising suite of open systems-based offerings that had become a key aspect of Wang's Office 2000 strategy.

"The imaging software they have now as part of Office 2000 is very good, very functional and covers virtually all the platforms one would want to do business on," said Walter Novinger, a senior partner at the Berkeley, Calif.-based consulting firm of Shaw, Novinger & Odell.

In the next breath, however, Novinger said that Wang's imaging business is not enough to pull the firm out of its current financial crisis. By some estimates, Wang's imaging sales have declined sharply from a high of \$90 million in 1990 (see chart).

Wary customers

Given that even healthy vendors, such as FileNet Corp. and Recognition Equipment, Inc., are having difficulty selling skittish cus-

tomers on imaging, does Wang honestly think it can attract users now?

"We grew [the imaging business] 25% last year, better than

\$35 million this year as "grossly inaccurate. To my knowledge, none of our existing orders for WISS or Open/image have been canceled since the Chapter 11 filing," Goulden said.

"Basically, we remain open for business, and we continue to do business."

Wang boldly entered the electronic document market in 1987 with a proprietary offering, the Wang Integrated Image System (WISS), on its VS platform. But the crown jewel in Wang's strategy, Wang Open/image, is a month away from commercial release. Wang Open/image will enable stand-alone personal computers and local-area networks to access images from an IBM RISC System/6000 server.

Scott McCready, a principal at IDC/Avante Technology, a market research and consulting firm in Framingham, Mass., said he does not think Goulden's bullishness is unwarranted.

"They could reasonably generate \$300 [million], \$400 [million] or \$500 million in sales over the next two or three years," he said.

But McCready said he believes Wang must act "within the next 30 days" to ink joint licensing agreements for core Wang technology with other providers of imaging systems. "They need this credibility fast," he said.

Deals in the works

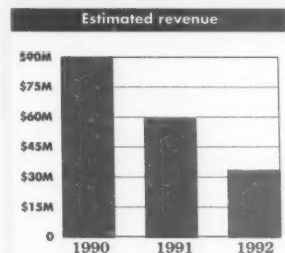
In fact, during the past several months, Wang had quietly begun exploring such relationships. The most prominent of the deals was signed late last year with Computer Associates International, Inc., which plans a series of image-enabled versions of its most popular database.

"Part of our reorganization plan is licensing, and we'll be aggressively licensing Open/image through alternative distribution channels, as well as our own sales channel," Goulden said.

But McCready, who was briefed by Wang recently, is not sure the troubled firm comprehends the urgency of this strategy. "I'm not sure they realize this is a survival issue," he said.

Treading water

Analysts count only about 200 of Wang's estimated 750 user sites actually using its Integrated Image System and Open/image products for serious production applications



Source: IDC/Avante Technology CW Chart: Michael Siggins

the overall market, which fell into single digits," said Dave Goulden, Wang's vice president of marketing. While not willing to provide actual numbers, Goulden labeled industry estimates that these revenues would be under

DEC flexes micro muscle with new PCs

BY MELINDA-CAROL BALLOU
CW STAFF

MAYNARD, Mass. — Last week's introduction of a line of low-cost, Industry Standard Architecture-based personal computers from Digital Equipment Corp. evinces just how seriously the company is pushing to expand its presence in the highly competitive microcomputer market.

The financially strained company is betting that users — both inside and outside its VAX/VMS base — will be attracted to the LP series' relatively low price points, ease of upgradability and technological advances [CW, Aug. 24].

Although DEC only has approximately 1% of the \$25.6 billion PC market, according to International Data Corp., analysts have said making headway in this cutthroat business could potentially boost the firm's financial turnaround.

"They're still not out of the woods — a 1% share says you've only got your toe in the water — but a lot of people had not consid-

ered them as being in the market at all before," said Dan Ness, senior analyst at Computer Intelligence, a La Jolla, Calif., research firm.

Computer Intelligence lists

then be shipped by boat to integration centers located on five continents. Motherboards will be flown in to the facilities, and the systems will then be assembled locally, avoiding higher customs charges associated with fully assembled boxes.

"It's clever. They get around duties and tariffs, and they make use of worldwide distribution centers," said Chris Christiansen, a research director at Inter-

The pressures in this market are steep and margins are thin, however. Targeting non-DEC installed bases while turning a profit will be challenging, analysts said.

One large banking firm — a large IBM and DEC site that has IBM and Compaq Computer Corp. PCs in-house — did not go for the new LP series. "Every time we had anyone evaluate them, DEC's PCs came out as good as anyone else's, but we had a commitment to [other PC] technology that we were already using," said a large banking user who requested anonymity. "There wasn't anything in their offering to make us jump."

Christiansen added, "They also will have to sell a lot of \$899-priced PCs before there's a substantial margin or profit coming out of those boxes."

Still, analysts are convinced DEC's strategy differs from earlier failed attempts.

"One advantage to the new line is the total commonality of components outside the daughtercard so that there will be less inventory of component parts, and the other is their stockpiling and two-stage pipeline distribution of products," said Steve Widen, an analyst at WorkGroup Technologies, Inc., a research firm in Hampton, N.H.

Packaged to move

DEC hopes its new low-profile PC line expands its penetration beyond VAX accounts. Three examples include:

Model*	Price	RAM	Hard Drive	Cache
DECpc 333SX LP	\$899	2M bytes	52M bytes	64K bytes
DECpc 433DX LP	\$1,849	4M bytes	122M bytes	128K bytes
DECpc 466D2 LP	\$2,199	4M bytes	122M bytes	128K bytes

* All models include MS-DOS 5.0 and Windows 3.1 preinstalled, three XT/AT bus slots, two serial ports, one parallel port, keyboard, mouse, video ports and support for up to four disk drives (two floppies and two integrated drive electronics hard drives).

CW Chart: Janell Genovese

DEC among the Top 5 fastest growing vendors in the PC market for the past five months.

Key to DEC's strategy is low-cost manufacturing and assembly. Components for the LP series PCs will be manufactured in DEC's Taiwan facility and will

national Data Corp., a market research firm in Framingham, Mass. "They're cutting their costs by going to a more efficient distribution system [while also making] enhancements which clearly add value to the boxes overall."

Great
names

Gary Hacker
Programmer/Analyst
United Musical Instruments
Elkhart, Ind.



Back in the caveman days ...

"Seldom is there a company ... with experience dating back to man's first LAN ..."
(From an MCCommunications press release) —
Wonder if we can use carbon dating to prove that?



You can't keep a good scanner down

The first UPC-reading scanner was installed at Marsh's Supermarket in Troy, Ohio, in 1974. The first item scanned was a 10-pack of Wrigley's gum marked "69 cents." Marsh's price was actually 67 cents, a fact the scanner noted correctly.

Source: Warner News Media's "Newsweek" newsletter (January 1992); ID Systems magazine; The Boston Herald, Aug. 21.

★ Diskettes
For Democracy

The East West Education Development Foundation is making disk copies of the Constitution, Declaration of Independence, Bill of Rights, Magna Carta and other historical documents for communist countries interested in learning about democracy. It also places donated computers into schools.

Do you have anecdotes about your users, your boss or your job? Know any industry trivia? If so, please contact Lory Dix or Jodie Naze at (800) 343-6474. If we use your ideas, we'll send you a gift.

OS/2's Domino Effect

IBM recently set up a huge domino display at the Windows & OS/2 Conference in Boston, celebrating the millionth copy of OS/2 sold. A representative from IBM's millionth customer, Caterpillar, toppled the display, which took three men and 20 hours to complete.

QUIPS & QUOTES

"Careful market research results in one sure thing: You will be late to market."

Stan Cornyn, president of Warner New Media, a Burbank, Calif.-based developer of CD-ROM audiovisual products.

Have you heard the one about ...



Q: How many computer programmers does it take to change a lightbulb?

A: None. That's a hardware problem.

or

A: One. The world revolves around them.

or

A: Three, if you're dealing with Dbase III programmers. One to write a bulb insertion routine, one to write a bulb extraction routine, and one to act as a system administrator to ensure that the job doesn't suffer from system lockout.

INSIDE LINES

User orientation

► A shift is under way in the pricing of Hewlett-Packard's minicomputer software. The company told attendees at an annual user conference in New Orleans last week that it plans to move pricing off a processor-based formula and will instead charge based on the number of users tied into a particular system. Under the processor model, an IS shopkeeper pays more for software after upgrading the CPU, even if the number of users remains constant. This news, which HP disclosed in response to criticism at an open mike session, was well-received by the many users who came to air their grievances. HP said it could implement the user-based pricing within a few months and that it plans to use its own Network License Server software to monitor the number of users on a system.

Window dressing

► Meanwhile, HP, which counts its HP/UX Unix and its proprietary MPE among the operating systems it runs on the PA-RISC chip that drives its minicomputers and workstations, may be adding another operating system to the PA-RISC fold. Rich Sevcik, general manager of HP's Commercial Systems Division, told users at roundtable sessions last week that HP is considering porting Windows NT to PA-RISC. Sevcik described the project as "exploratory."

Picture this sale

► Atex, Eastman Kodak's publishing software arm, is a company in search of a new owner, according to reports that are filtering back from a user group meeting last week. A spokesman from the company confirmed that the company is indeed on the block and that there are several buyers interested. The sale of the Bedford, Mass.-based firm could go through in the next few weeks, although an early 1993 time frame was also cited.

It's always something

► Users in the know have pegged most of Compaq's product backlog on a dearth of disk drives, chiefly from Connor Peripherals. One user said the Prolinea manufacturing line is running at 60% capacity because of this shortage, and another said that for want of a drive, a 50-MHz machine was not to be had.

Taking the high ground

► Dell, on the other hand, looks like it is planning to keep away from the competitive sandbox a little more this fall, when IBM is scheduled to make its tarry entry into the low-cost PC arena. Sources say that although Compaq will lower prices again, Dell will probably not be as aggressive in matching the cuts. Of course, Dell has all the business it can handle right now — so much so that the Austin, Texas-based vendor is planning on cutting back on marketing and advertising during the next few quarters.

Equity means business

► While Intersolv broke U.S. sales shackles with IBM last week, Synon — a newer AD/Cycle partner — was busy preparing for an announcement planned for today. Synon, a \$50 million CASE company in Larkspur, Calif., is expected to unveil an equity deal with IBM. Big Blue owns a piece of other AD/Cycle partners such as Bachman and KnowledgeWare. The move looks like an initial step toward redefining AD/Cycle to focus more closely on Unix and client/server development.

Industry consultant John Logan, executive vice president of the Aberdeen Group, offered some unique interpretations of downsizing and customer relations while delivering a closing presentation at last week's Interex HP user conference. Recalling that IBM had declared 1987 the year of the customer, Logan mused, "They figured out what the customer would pay more for, and they charged him for it." Fast-forwarding to 1992, he advised IS practitioners that "the sneaky way to do downsizing is to delay the mainframe upgrade." And in an observation on the evolving psychology of the often difficult and disruptive downsizing process, Logan noted, "Three years ago, people were 'retrained.' Now they're 'flexible.'" News editor Alan Alper is very flexible — as long as he gets news tips. Phone, fax or CompuServe him at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's 24-hour voice-mail tip line at (508) 820-8555.



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<i>Elapsed Time</i>	<i>CPU Time</i>	<i>EXCPs</i>	<i>Job Cost</i>
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